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VETERINARY MEDICINE

MARCH 1943

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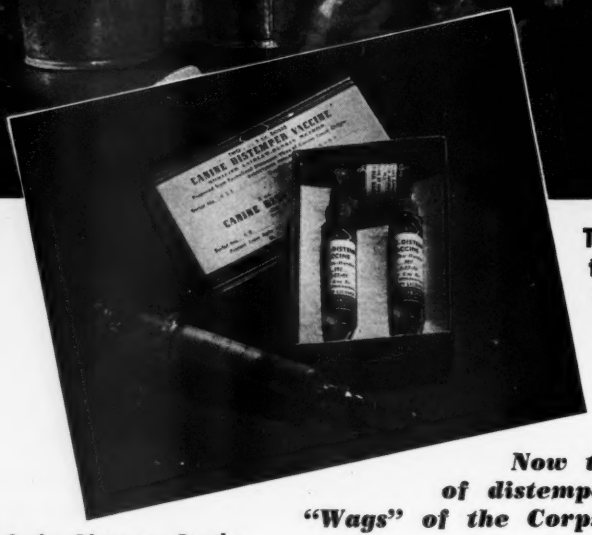

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Five per cent of sulfaguanidine in the feed has been found by controlled experiment to be effective in preventing heavy losses from coccidiosis in poultry.

Through animal experiments it has been found by surgeons that sulfanilamide implanted locally is more effective in preventing wound infection than when given systemically. This is especially true in its effectiveness against *Clostridium welchi* and *Chlostridium histolyticum*.

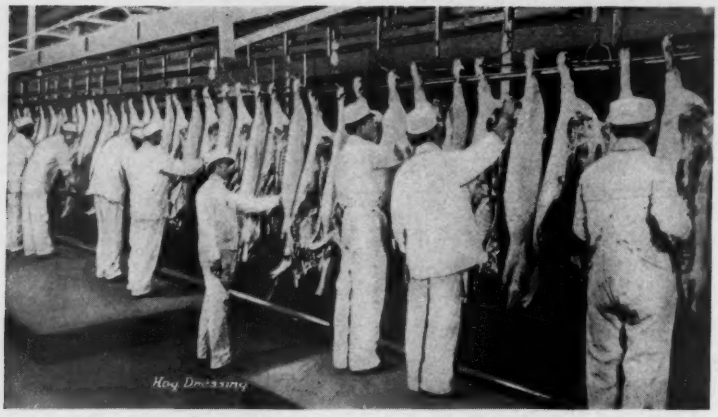
The Salvage Division of the British Ministry of Food classifies foodstuffs damaged in air raids or otherwise as (1) sound, (2) damaged but fit for human consumption, (3) damaged but fit for animal feeding, (4) damaged but fit for industrial use and (5) useless.

In a case at Taunton (England) a swine breeder was summoned for feeding unboiled swill to pigs. When he claimed that instead of his feeding the unboiled swill to the pigs, they had gotten at it in the trailer in which it was transported, the charge of feeding unboiled swill to the pigs was dismissed but the defendant was found guilty and fined for allowing the pigs to come in contact with the swill.

War has always meant blood and suffering. But all the previous wars in its history have not cost so much blood and suffering to the United States Navy as this conflict cost in the first six months.—Rear Admiral John Downes, U. S. N.

Levaditi (1941) succeeded in prolonging the life of mice inoculated with T. evansi, T. brucei, T. equinum and T. equiperdum by the administration of indium tartrate, and recommend a trial of it in these infections in the horse. A trial of two other indium salts, chloride and hyposulphite, also is suggested by the results of his experiments on mice.

Ordinarily, goats do not give milk unless they have been kidded. But kidding, according to hormone expert Dr. S. J. Folley of the British National Institute for Research in Dairying, involves energy-consuming gestatory processes which slow milk production. By treating goats with the synthetic hormones diethylstilbestrol and hexestrol. Folley causes virgin goats to develop udders and commence giving milk. The quality of milk given by a cow can be controlled to some extent by similar synthetic-hormone magic. — *National Provisioner.*



Meat and Food Inspectors

Veterinary officers who completed the course in the War Department School of Meat and Dairy Hygiene at Chicago, January 26, 1943, are as follows: Majors James H. Allen, Fonsoe M. Bolin, Charles C. Harman, Jr., Elmer L. Metcalfe, Sidney J. Mitchael and Lloyd C. Tekse.

Captains Jack D. Bender, Patrick J. Creedon and Robert J. Miller.

First Lieutenants Donald D. Demke, Robert L. Griffith, Jr., Thomas B. Heim, Edward T. Marsh, Newton A. McCosh, Kenneth J. McKenzie, Floyd R. Mencimer, John L. O'Neill, Isidor I. Sprecker, Robert J. Stadler, Albert A. Taylor, Joseph W. Walker and Dale J. Yokum.

U. S. Free from Most of Major Livestock Maladies

The United States is entirely free from 10 of the 15 livestock maladies that are of major importance in the world, the U. S. Department of Agriculture reports. Among these 10 plagues are included foot-and-mouth disease, rinderpest, surra, murrina, nagana, etc.

Of the five other diseases, bovine tuberculosis and cattle tick fever have been practically eradicated and equine encephalomyelitis, hog cholera, and pullorum disease are under effective control.

In this report of Dr. John R. Mohler, Chief of the B.A.I., the symptoms are given and the means of preventing 22 diseases occurring in the United States.

Meat and the War Emergency

In the fiscal year ending June 30, 1943, we will probably produce 24 billion pounds of meat. This is 4½ billion pounds more than was produced in 1941.

Armed forces consume more than double the national average, and they must have all the meat they need.

In supplying these needs it is necessary that civilian meat supplies should be limited. Hence the government launched the Share-the-Meat program. The National Live Stock and Meat Board is cooperating.

We have carried on a program in the Army featuring the cutting, cooking, carving and food value of meat. We have conducted this work at army posts from coast to coast. We have trained hundreds of men as meat specialists to speed up this work.

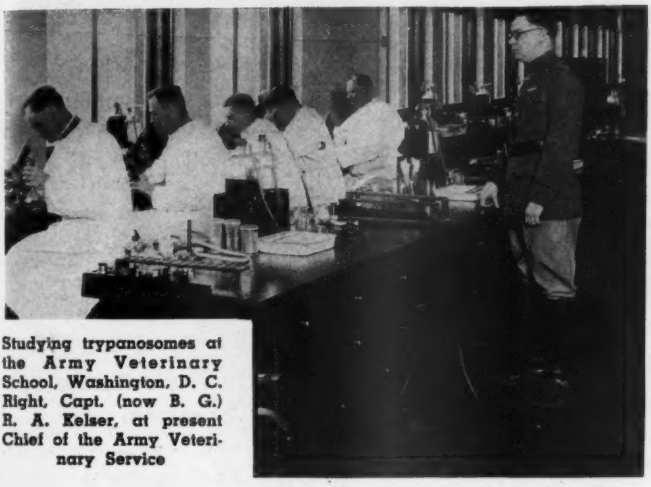
Robert P. Patterson, Under Secretary of War, in commending our program of meat research and education, said that because of our cooperation, the American soldiers have been definitely better fed.

In the interests of proper nutrition, we have put a staff of home economists in the field who, in programs in the 48 states, are pointing out the foods needed in an adequate diet. They cooperate with other nutrition committees, Red Cross Chapters, defense organizations, etc.

In World War I, we had meatless days. Instead, we now have the Share-the-Meat program.—Harry W. Farr, Greeley, Colo., Chairman of the *National Live Stock and Meat Board.*

Achievements of the Army Veterinary Corps

A resume of the accomplishments of the Veterinary Corps, and particularly those of Raymond A. Kelser, Brigadier General, Medical Department, U. S. Army, Chief of the Veterinary Division of the Surgeon General's Office, War Department, as given by Edgar Erskine Hume,[1] is as follows:



Studying trypanosomes at the Army Veterinary School, Washington, D. C. Right, Capt. (now B. G.) R. A. Kelser, at present Chief of the Army Veterinary Service

With the creation of the Veterinary Corps as one of the branches of the Medical Department of the Army by the National Defense Act of 1916, a new era began in the study of diseases of animals which may be transmitted to human beings. The officer who has done most in this field is the chief of the Veterinary Corps, Brigadier-General Raymond Alexander Kelser. His most important contributions are the following:

Encephalomyelitis: Prior to Kelser's work the virus diseases known to be transmitted by the mosquito were yellow fever and dengue. Kelser demonstrated the transmission of equine encephalomyelitis by mosquitoes, ten species of *Aëdes* having already been shown capable of such transmission. The disease is known to be highly important medically, in that several thousands of human cases occurred last year in Minnesota, the Dakotas and adjacent Canada. The virus associated with this human disease has been found in naturally infected mosquitoes. This work has served to direct attention to the important possibility of insect transmission of poliomyelitis.

Rinderpest had long been a serious disease of cattle in the Philippine Islands before the American occupation, and handicapped the livestock and dairy industries. Major-General Leonard Wood asked that Major Kelser be assigned to study this problem. After two years' work, Kelser developed a vaccine against this disease. It is of uniformly high potency, safe for use, and prepared in a relatively short time. Within approximately five years of the introduction of Kelser's vaccine rinderpest was eradicated from the Philippines. Thus 1800 *carabaos* (water buffalo) which formerly perished each year from this disease, have been saved.

Surra, a uniformly fatal equine disease caused by *Trypanosoma evansi* was a serious problem in the Philippines, and accounted on several occasions for wholesale loss of Army animals. While the vector had been considered the fly, there was great disagreement as to the species concerned. Mitzmain has suggested that *Tabanus striatus* was the vector, but it had not been proved. Kelser showed that this insect is indeed the agent, proving this in both experimental animals and in natural outbreak. Thus Kelser is to Mitzmain with respect to surra, what Walter Reed was to Finlay with respect to yellow

[1] Hume, Edgar Erskine, Colonel, Medical Corps, U. S. Army, 1942. Scientific Accomplishments of the United States Army Medical Corps (Part II). *Transactions and Studies of the College of Physicians of Philadelphia.* 10:2 (4th Series), p. 123.

fever. In both cases the Army officer proved what had previously been but a supposition.

Rabies vaccine, in which the virus is inactivated by chloroform has been introduced by Kelser. This vaccine is used in the immunization of both animals and man, and has been found more effective than vaccine made by other methods.

There have been other investigations of importance in human medicine done by our veterinary officers. Lieutenant-Colonels John Harold Kintner, Veterinary Corps, and Rufus Leroy Holt, Medical Corps, have done valuable research on equine osteomalacia. Lieutenant-Colonel Raymond Randall, at the Army Veterinary School, has done important work in producing a vaccine against equine encephalomyelitis. Though he did not originate this vaccine, he has made a number of improvements in the technique of its preparation. Chick embryos are used. Colonel Jean R. Underwood found that dhobie itch of equines in the Philippines is a verminous dermatitis. Lieutenant-Colonel Francois Hue Kari Reynolds has developed an antigen for use in a complement-fixation test for trypanosomiasis.

Manufacture of Dog Food Restricted

Because of the shortage of protein for animal feed, previously discussed (February issue of VETERINARY MEDICINE, page 47), the War Food Administrator has ordered, effective January 29th, that the protein content of commercially prepared foods for pets be limited to not more than 24%, of which not more than one-third shall be proteins of animal origin.

The same order limits the total production of dog food manufactures, for the six month period ending June 30, 1943, to 50% of the amount produced in the whole of 1941, or 50% of four times the amount produced in the last three months of 1943, whichever is the greater. In other words there can be no increase in the omunt of commercial dog food manufactured during the first six months of 1943 and it is quite probable there may be a reduction in the amount for the last six months of the current year.

It is stated this order will make available thousands of tons of both animal and vegetable proteins for food producing animals without impairing the adequacy of dog foods, of which many brands contained an unnecessarily high ratio of protein, particularly of animal protein; some brands containing three times as much as is required for adequate nutrition.

The increased production of poultry and swine essential to the war effort is being impeded by lack of sufficient protein feeds. This order will not solve the problem, but it will help to the extent of many thousands of tons. If other sources of animal protein can be developed there may be no further restriction on the manufacture of dog food, but obviously the possibility of such restriction exists.

Fur Industry Experiences Feed Shortage

The fur industry has been hit much harder than the dog industry by the shortage of feed. Formerly a great deal of fresh water herring was fed. Practically all of it is now demanded for human food, and what is available for animal food sells at a price too high for fox and mink raisers to afford. Great quantities of jack rabbits were available to the fur farmers in past years but now no ammunition can be spared to kill them. Horsemeat, which has been the basic food of fur animals, is high in price and becoming scarcer day by day. The solution of the problem of obtaining food for fur animals is not in sight. The situation pressages drastic curtailment of the fur industry. Some of this reduction has already taken place. Fortunately that will not impede the war effort as extensive trials have demonstrated that sheep skin with the pile trimmed to from ¼ to 1 inch affords greater protection from cold than any other kind of clothing and has been adopted by the army for soldiers serving arctic climates.

Dogs for Defense—WAGS*

War Dogs were used by the ancients, and Egyptian carvings show them being turned on the enemy with their chariots.

The Tower of London has armor used by the War Dogs in the time of the Crusades, each set bearing the crest of the owner.

Germany used dogs extensively in the last war, and since then had been building up her dog army unhampered by the Versailles treaty until she had 50,000 trained dogs on duty when the war started. As late as a few years ago she was still taking many of our best dogs by forged applications through Holland.

Japan was given 10,000 trained dogs from Germany, and has been using them in her China, Burma and Pacific campaigns.

Russia has a large number of dogs on duty, and the same for England, which is using them in Libya.

The dogs have been so successful that the War Department has gradually raised the number they want from 10,000 to 298,000 based on their success already, both at home and abroad with the army, the navy, the marines and the coast guard.

The role of these War Dogs is varied. The English dress them in Arab Costumes and draw enemy fire in the shimmering glare of the desert atmosphere, thus locating the enemy gun emplacements. They are also used to carry light ammunition, machine guns, as sledge dogs, first aid dogs, wire laying dogs, etc., but the largest field is as sentry dogs for patrolling, especially at night, as their superior sense of hearing and smelling make them aware of strangers before their guard. This patrol duty covers the beaches and coastal areas, shipbuilding plants, airplane hangars, warehouses, arsenals, navy yards, defense plants, etc., and has caught hundreds of saboteurs in various parts of the United States.

One man and a sentry dog have been found equal to 6 regular guards.

The qualifications for these dogs are that they be over 18 inches at the shoulder; bold dogs that cannot be intimidated by strangers and one to five years of age.

The following includes portions of the latest official bulletin from Harry I. Caesar, National President of Dogs for Defense:

The breeds most wanted by the army are: German Shepherd Dogs, Belgian Shepherd Dogs, Doberman Pinschers, Boxers, German Short Hair Pointers, Great Danes, Old English Sheepsdogs, Airedale Terriers, Kerry Blue Terriers, Dalmations, Giant Schnauzers, Collies, Poodles and Crossbreds of the above breeds.

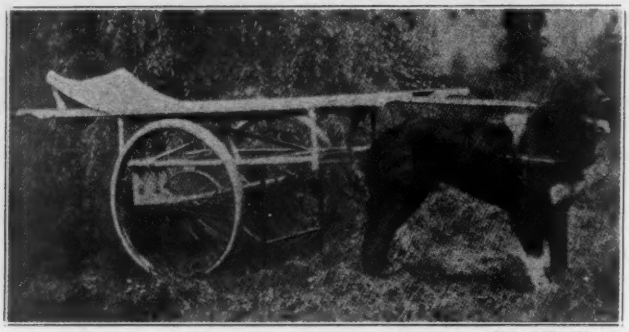
Pack Dogs (Mastiffs, Bull Mastiffs, Komondorok, Kuvasok, Bernese Mountain

Vet. Mil. History

In Germany and Japan women have trained war dogs by the thousands in time of peace

* Excerpts from article by W. Newbold Ely, Lt. Col. U. S. C. G. R. President War Dog Training Association of Pennsylvania—*Hunting & Fishing*, January, 1943.

Dogs, Newfoundlands, Saint Bernards, Great Pyrenees and also Irish Wolfhounds, Borzois, Scottish Deerhounds, Greyhounds, Bloodhounds) can be delivered only on Special Army Order.



Vet. Mil. History

A Medical Department Dog (French) in use in World War I

Sledge dogs (Alaskan Malamutes, Eskimos, Samoyedes, Siberian Huskies) are not procured for the Government by Dogs For Defense.

The Army does not want the following breeds: Afghan Hounds, Chows, Salukis, Whippets, Pulik, and Keeshonden.

The Army is now doing experimental work with Bull Terriers, Bulldogs, and Staffordshire Terriers. At present they have a sufficient number of these breeds for this purpose.

Because of the cold climate, short haired dogs such as Danes, Dobermans and Boxers cannot be sent to Fort Robinson, Nebraska.

It has been decided to continue the use of the donor's release. This should be signed at the time the dog is taken, and sent to the New York office with the original questionnaire when the dog is shipped.

In addition to Front Royal, Virginia and Fort Robinson, Nebraska, there is a Dogs for Defense station at San Mateo, California.

On account of the fact that K-9, the Dog Corps, will be continued after the War, the army has stated that in most cases the owner cannot expect the dog back.

The Coast Guard of the 4th Naval District has a special arrangement with Washington whereby they take (a) only German Shepherds; (b) take them from the donor immediately; (c) enlist them if donor wishes, just for the duration of the war.

The dogs receive the best of food and care in the service and a "service-man trainer" goes on duty along with the dog for which he has affection and great pride. The period of training is from three to eight weeks, depending on the adaptability of the dog.

Vet. Mil. History

A Commissary Dog (French) of World War I

In view of the new army requirements, the regional directors and their committees automatically become the most important part of this organization. The name of your state regional director may be obtained from Dogs for Defense, 22 East 60th St., New York City.

Five things are needed by Dogs for Defense: Money, Reception Centers, Dogs, Raising Puppies, Training of Dogs.

See what YOU can do about one or more of the above—NOW!

Life Histories of Gasterophilus Spp. In the Horse

The statement in the caption of the illustration of the horse botfly, *Gasterophilus equi* (page 12 of the January issue of VETERINARY MEDICINE): "Eggs of this gadfly are taken into the horse's stomach with the feed and there the larvae (bots) develop" is misleading in its brevity, since the eggs hatch before or at the time that they reach the horse's mouth. The following gives in greater detail what was summarized too briefly in the caption.

There are, in the United States, three distinct species of botflies. These are commonly known as the horse botfly or nitfly, *Gasterophilus intestinalis*, the nose- or lipfly, *Gasterophilus haemorrhoidalis* and the chin- or throatfly, *Gasterophilus nasalis*, the last two deriving their common names from the fact that they deposit their eggs or nits on the lips and under the throat of the horse, respectively, while the common botfly or nitfly deposits its eggs on the forelegs, breast, shoulders, and other parts of the body. The eggs of the common botfly require both moisture and pressure for hatching. Minute, spiny larvae or maggots develop in the eggs in about seven days but they remain in the shell until they are rubbed or licked by the horse. They remain alive but unhatched for several months. When the horse bites itself the young bots are taken into the mouth where they burrow into the surface of the tongue. They remain in the tongue for about three or four weeks and then pass on to the stomach where they attach themselves to the white lining of the cardiac or anterior part.

The nose, or lip botfly, deposits its eggs close to the skin on the upper and lower lips, but mostly on the upper lip. They require moisture for hatching but friction is not essential. They hatch in about two days and the newly-hatched larvae or maggots burrow into and through the skin until they reach the inner surface of the lips, causing considerable irritation by their burrowing. They remain in the lips for about six weeks and then pass into the stomach. They become attached to various parts of the stomach but are most abundant in the portion nearest the small intestine. Some may also be found attached in the upper part of the small intestine.

The eggs of the throat botfly hatch in about six days without moisture or friction. These maggots crawl into the mouth where they lodge principally in the pockets between the molar teeth. They remain in the mouth for about three to four weeks and then pass through the stomach and attach themselves to the walls of the upper part of the small intestine.

The larvae of the common botfly and those of the chin- or throatfly, remain in the stomach for several months. When they reach maturity they release their hold on the stomach wall, pass into the intestine, and reach the outside with the dejecta. The larvae of the nose- or lip botfly, let go their hold on the wall of the stomach, or upper part of the small intestine, some time before maturity and pass into the rectum, where they again attach themselves for about two or three days. They then drop off the anus any time; that is, they do not necessarily pass out with the feces. After reaching the ground the bots burrow into the soil to a depth sufficient to escape the direct rays of the sun. In from three to four days the outer skin hardens and forms a protective covering in which the bot changes into a fly. The duration of this resting stage for all three species varies from 20 to 70 days depending upon the temperature.

G. DIKMANS

Washington, D. C.

Bot Fatalities

Bots may enter the bile ducts, causing fatal occlusion. The symptoms are severe colic, extreme icterus, convulsions and death within a few hours. I have observed two fatal cases from the accumulation of bots in the pyloric region of the stomach *and duodenum; one caused gastric dilation* with rupture and death within 24 hours. The other caused death from rupture of the duodenum after a severe colic attack of 48 hours. Both were in the month of June.—D. H. Udall in *Practice of Veterinary Medicine*.

Incidence of Worm Parasites in a Large Stud of Horses

By F. B. HADLEY*
Madison, Wisconsin

THIS study was made on 71 head of horses in one stud located in Wisconsin. The methods of examination for evidence of parasite infection consisted of (a) making egg counts of the feces; (b) culturing the feces in petri dishes at room temperature for larvae and (c) identifying the larvae by microscopic examination. By a combination of these methods it was found that 100% of this large group of horses harbored small strongyles (*Trichonema*); 80% one or more of the three large strongyles known as red worms, viz., *Strongylus equinus, Strongylus edentatus,* and *Strongylus vulgaris*; 76% the large intestinal round worm (Parascaris); 32% tapeworms (Anaplocephala spp.); 15.5% the very small and slender threadworm (*Strongyloides westeri*). Further analysis of the experiment data shows that 21% of the horses harbored but one species of worm, 38% two species, 37% three species, 4% all four species. A different distribution would have been found if the animals had been grouped according to age, as will be explained later.

In addition to the roundworms mentioned above there are others which may infest horses. Chief among these are the large stomach worm (Habronema spp.), the small stomach worm (*Trichostrongylus axei*) and the pinworm (*Oxyuris equi*). It is interesting that none of the horses included in this study was found to be infested with any of these parasites, although they are known to occur rather commonly in horses in other parts of the country. A survey including a larger number of Wisconsin horses undoubtedly would show some infected with one or more of the worms last mentioned.

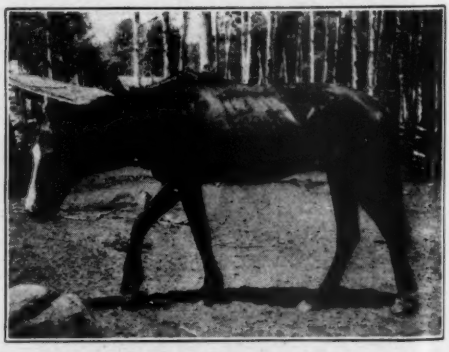
Red Worms Most Damaging

The three strongyle worms are commonly termed red worms, or blood worms because of their color, which is caused by the blood they extract from their host. These worms are responsible for "pasture disease" in horses, the significance of which is obvious.

The *Strongylus vulgaris* is the most damaging of the three red worms. This is due to the fact that it migrates through the body to locate during one stage of its existence in the root of the artery which supplies blood to the large intestine. Photographs of the third and fourth stage larvae of *S. vulgaris* and of the adult worm from the intestine are submitted herewith with appropriate legends, q.v.

A description of the supposed course of migration would be too detailed to justify including in this report. Moreover, parasitologists are not in agreement as to the exact route taken by the larva in its journey through the body of the horse. It is hoped that further study will shed more light on this matter.

The question is often asked whether the eggs of these strongyles and other intestinal worms passed in the feces of the horse are capable of living over the winter in the pasture. The answer is that probably a few do, but the small number which survive is of little significance. Of much greater importance are the eggs passed daily by the animals. These hatch into larvae, which crawl up on blades of grass and thus gain entrance to the digestive tract. Within a relatively short time after reaching the intestine these larval forms develop into adult worms, which damage the host in various ways and soon start to lay eggs on their



A horse affected with strongylosis may be quite anemic

* Department of Veterinary Science, University of Wisconsin.

own account. These eggs are, of course, passed in the droppings and eventually develop into the infective larval stage, thus completing the life cycle of the parasite.

Seasonal Variation

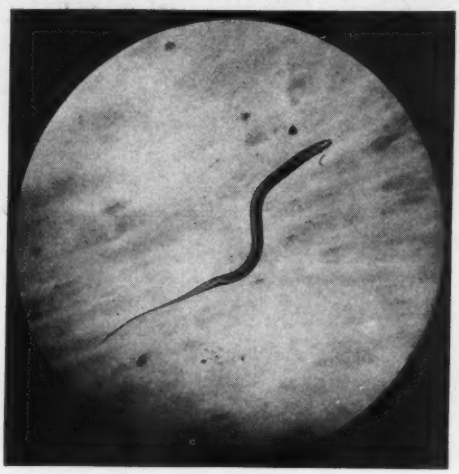
A statistical study of the seasonal frequency of strongyle worm eggs in the feces of the horses included in the experiment lead to the conclusion that while the number of eggs shed was practically the same during the spring and fall, the incidence during the winter was lower. Just what, if any, influence the outside winter temperature plays in egg production has not been determined, but these data suggest that it may be a factor. At any rate, acknowledgement is hereby made of the aid given by Prof. C. Eisenhart, Station Statistician, for analysis of the data recorded from the routine microscopic examination of the thousands of fecal samples secured. Some assistance was received from N.Y.A.

Life History of the Thread Worm

The thread worm (*Strongyloides westeri*) was recovered from the feces of all foals examined at the appropriate age. This parasite is different from most other worms of horses in that the eggs hatch into larvae before they reach the foal's digestive canal. In the intestines of the foal the worm produces many eggs which develop rapidly to the larval stage and are passed in the feces. We have demonstrated the thread worm in foals less than one month but not in foals over one year of age. Apparently, therefore, it is a parasite of young foals rather than of older horses. This parasite is believed to be responsible for some cases of diarrhea and unthriftiness. As our knowledge of the portal of infection is derived from observations on other species of the genus, we are continuing the study of this worm with the hope of shedding more light upon its life cycle. One group of parasitologists believe that the infective larvae penetrate through the skin of the host (foal) and are carried by the blood to the lungs, from whence they crawl into the bronchi and up the windpipe to the back of the mouth and are swallowed, thus reaching the intestines in which they develop into adults and produce eggs.

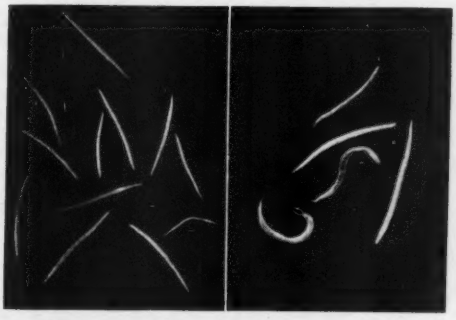
Anthelmintic Treatment of Horses

Drugs administered to rid animals of worms are called vermifuges, anthelmintics, or worm expellers. They include a large



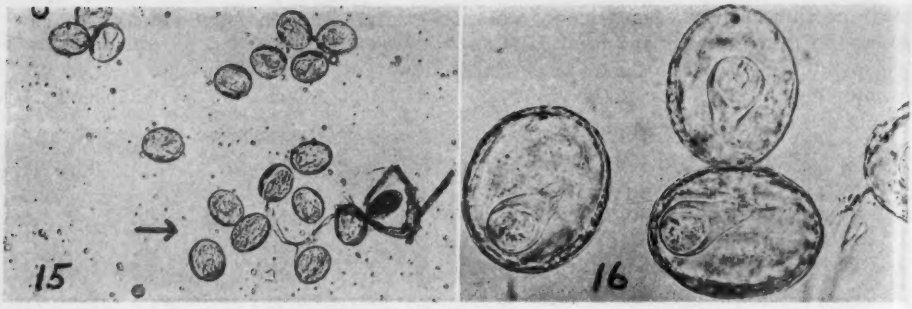
Third stage larva of the *Strongylus vulgaris*, enlarged 177 times, from a blade of grass

number of agents which have been used with different degrees of success. All anthelmintics have certain limitations and are poisonous in too large doses, so should be used only as directed by a veterinarian.



Left, fourth stage larvae of the *Strongylus vulgaris*, natural size, from an aneurysm in an artery. Right, Mature worms, natural size, from the intestine

Because horse owners and veterinarians have been asking for information about the value and use of the widely advertised chemical, phenothiazine, as an anthelmintic, the action of this drug was studied in so far as facilities permitted. One of the drawbacks to phenothiazine was found to be its poisonous properties. Reports re-



Eggs of *Anoplocephala mamillans*, a tape worm of the horse. Fig. 15, X100; Fig. 16, X400—*Benbrook*

ceived from the field and gleaned from the literature indicate that it must be given with caution. For instance, one Wisconsin farmer laboring under the false impression that if one dose of phenothiazine was good, two doses should be better, got into serious trouble. Some of the horses which he treated died from the poisonous effects of the drug because the dose was too large. Others became sick but recovered. Many other reports of unsatisfactory results could be cited, especially in aged horses, which do not respond satisfactorily to phenothiazine. The use of this drug to de-worm sheep was reported in Wisconsin Bulletin 453 published in December, 1941, q.v.

Although more work with phenothiazine on horses is needed before the last word can be said about this drug, enough information is at hand to warrant stating that it should not be relied upon to expel either the large round worms, the stomach worms, or the tapeworms of horses, even though it is indicated for use against the red worms.

To be certain of the kinds and numbers of worm eggs present and the drug or drugs indicated to deworm horses, samples of feces may be sent to the station veterinary laboratory for identification and advice as to treatment. The mere finding of worms in the droppings of horses certainly does not warrant dosing with a commercial worm expeller. Most parasites respond only to treatment with certain drugs and there is no one drug suitable for removing all types of parasites.

In conclusion it may be stated that while phenothiazine is probably the best and most effective agent yet found to remove strongyloid worms from horses, its general use as an anthelmintic cannot be recommended. Even safe doses tinge the urine an alarmingly red color. Overdoses damage the kidneys and liver. Moreover, neither this nor any other drug should be expected to remove completely and permanently all the internal parasites harbored by horses. This is because the chance of reinfection is so great and because the parasite eggs are so resistant to outside influences. Furthermore, certain strongyles located in parts of the horse's body other than the intestine, cannot be reached by phenothiazine or other anthelmintic given by way of the mouth. The concensus in regard to parasite control is that "worming" should not be undertaken as a routine matter, but should be resorted to only after it is definitely proved to be necessary. Even this procedure has limitations because reinfection is bound to occur, thus only temporary relief is afforded.

Control of Worms in Horses

In the management of horses infected with stomach and intestinal worms control measures are far more important than is treatment with drugs to expel these parasites. Adequate nutrition of horses, with attention to sanitation, will accomplish more than worm remedies. This is because well-nourished animals are better able to withstand attack by parasites of all kinds than those in a low state of nutrition. The point is that, by keeping horses in good physical condition, they can carry a fairly heavy load of parasites without much detriment. This implys that horses in good condition are better off if not wormed.

Dairy Cattle Practice*

By W. C. GLENNY
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Eversion of the Uterus

THIS condition often taxes the ingenuity of the practitioner. Judicious handling of the case may mean the difference between success and failure, between saving the animal and losing her. Immediate danger to the life of the patient is hemorrhage and shock. Hemorrhage in the abdominal cavity and the blood forced by the straining into the prolapsed portion of the uterus is not only dangerous, due to loss of blood, but may increase greatly the difficulty of replacing the organ. Infection and subsequent loss or emaciation of the animal is a secondary hazard in eversion of the uterus.

Treatment

The immediate use of cardiac stimulants is questionable as sudden stimulation of the heart may prove disastrous. Examination of the mucous membranes and the everted uterus will indicate the extent of the loss of blood. Immediate transfusion of 500 to 1000cc of citrated blood aids in combating the effects of internal hemorrhage and is to be preferred to stimulants. Keep the animal as quiet as possible and in cold weather blanket warmly.

Any placental tissue remaining attached to the uterus usually can be removed without serious danger of increasing the loss of blood. The everted mucous membrane should be freed of gross contamination, and cleaned as thoroughly as possible with luke warm water and a mild disinfectant. Do not use water that is hot as it will increase congestion around the prolapsed portion and make more difficult normal placement. Cold water is better if there is little danger of shock. Place the uterus on a piece of clean cloth or rubber and keep it moist at all times to prevent drying and focal necrosis.

Epidural Anesthesia.—The injection of 5cc of a 2% solution of procaine, or 8 to 10cc of a 1% solution, epidurally, usually prevents straining during replacement of the uterus. It should be given before the cleaning operation. This will allow 5 to 10 minutes for the anesthetic to take effect. If the animal is down give the same dosage as it will not interfere with her regaining her feet later. Additional anesthetic should be given if, in 10 minutes, sufficient anesthesia is not produced to control the straining.

On a stubborn eversion, extra help is welcome. Two helpers to hold the uterus on a plane level with the site of operation and one to aid in replacing it are advantageous. In this manner only two need clean hands and arms for the ordeal—the veterinarian and the first assistant.

Replacement.—In replacing the eversion I prefer to procure clean dish towels, those from washed muslin sacks, and drape them over my hand and arm. Tie two or three end to end for sufficient length before starting the operation .Place the draped fist in the apex of the everted horn and by firm pressure start the eversion back. If resistence is encountered, check for a misplaced bladder or a large blood clot in the prolapsed portion. Often either can be overcome by massage and pressure without harm to the tissues. If not, it will be necessary to empty the bladder with a large hypodermic needle, or if the obstruction be due to a large, firm clot of blood it may be necessary to make an incision through the uterine wall and scrape out the clotted blood. The incision should be closed by a continuous suture of silk or catgut.

Apply firm, yet cautious pressure, massaging and kneeding until the organ goes back into place. Then with the hand within the uterus, as far as the arm can reach, attempt to smooth out all folds and place the uterus in as nearly a normal position as possible. A partial replacement will lead to further straining, when the spinal anesthesia wears off and perhaps to a new eversion. Even when the organ is replaced with care, a partial eversion will often recur with contraction of the cervix about mid-

*Presented at the Annual Meeting of the Eastern Iowa Veterinary Association, Cedar Rapids, Oct. 13-14, 1942.

way on it. This causes severe straining and as it is impossible to relax the contraction of the cervix, the patient is doomed from exhaustion, straining and toxemia from necrosis of the partially everted uterus.

Many ingenious devices may be used to prevent recurrence of the eversion once the

Complications arise when the owner tries to deliver the calf as in this case—*Photo by Baker*

uterus has been replaced but most cases respond favorably to vulva sutures. If further help is needed to prevent the organ from being forced through the vaginal canal, a clean fruit jar, with the lid end toward the vulva may be placed in the vagina before the sutures are applied. In suturing the vulva I make it a practice never to suture through the mucous membrane, but place the sutures through the outer skin of the vulva. This incites less straining than does piercing the sensitive mucosa and the danger of suture infection is also less. Furthermore the sutures are easily removed when they have served their purpose, if they are inserted well outside the vulva. Ordinarily they may be removed in two to four days.

Uterine Eversion Complicated by Post Parturient Paresis

Parturient paresis is not common as a complicating factor in eversion of the uterus but it does occur and it is a serious mistake to overlook the possibility. The patient may expire with a hypocalcemia that could have been prevented. Extreme caution is necessary under these conditions, when injecting calcium preparations intravenously. It is wise to delay the injection until several hours after replacing the uterus to avoid shock and cardiac collapse. Inject small doses slowly, and repeat as often as necessary always with the solution near to body temperature.

Prolapse of the Vagina

This is most common in advanced pregnancy but may occur following parturition. Replacement of the vagina with the aid of epidural anesthesia is not difficult. A fruit jar serves well to keep it in place with vulva sutures. This may be left in place 3 to 5 days if the case is of a chronic nature. If the eversion persists following a treatment for a week, it is wise to dispose of the animal.

A physiological prolapse may go a month or two unattended with no ill effect. Attempts to replace it may cause only more trouble. It is wise to not treat these cases if there is no evidence of infection or necrosis. In many cases suturing aggravates the condition. This type of vaginal prolapse is common in dairy goats when heavy with two or three kids.

Mastitis

The present trend in mastitis care is to establish a definite program of sanitation and treatment to check the spread within a herd. This movement has been enhanced by the numerous intramammary injections which have become available recently. Advertising to the laity as well as to the profession has forced remedies into use that have boomeranged back to the drug manufacturer as being questionable. Indiscriminate use of mastitis remedies by the laity and profession has not helped the reputation of the remedies. These new remedies have their time and place but none of them is a panacea. Careful diagnostic measures —microscopic examination, Hotis tests of the milk and physical examinations of the udders—are necessary to determine the time and place to use them. They require intelligent administration also.

The advantages of a relatively free mastitis herd are obvious. It means increased production of a better quality of milk and

fewer cow replacements. Mastitis programs are sound and practical and should be encouraged. The disadvantages may be:

1. Apparent cooperation with the owner of the herd but lack of competent farm help—if any help at all.

2. Difficulty in preventing reinfection following treatment during lactation.

3. Loss of milk due to intramammary injections in lactating cows.

4. Apparent temporary or permanent damage to the udder tissue from intramammary injections during lactation.

5. A low degree of effectiveness of intramammary injections during lactation, making several repetitions necessary.

6. Spread of mastitis within a herd by improper technic in making udder injections.

7. Improper selection of quarters to inject.

8. The expense of treatment during lactation on a heavily infected herd may be prohibitive.

For the duration of the war it may be better to confine the treatment of mastitis to dry cows or an occasional lactating cow depending on the situation in a given herd. With the return of competent farm help more mastitis control programs can be instituted with advantage. Sanitation is always in order in the dairy barn and if we do nothing more than keep the dairymen sanitation conscious it will be worth the effort.

The improper use of milking machines is one of the most prolific causes of the spread of mastitis infection. A careful check on the pressure of the machines is necessary to control trauma from unnecessary suction during milking. Wet hand milking should be discouraged—banned. Properly balanced rations are indispensable to the health of cows. Clipping the udder and rear quarters plays a part in controlling infection. Suitable length of stalls to prevent udder trauma is also a factor in holding down the incidence of mastitis.

The Bacterin treatment of mastitis has not proved satisfactory in my experience.

On the whole I have found that labor shortage, present milk prices, high beef prices, improper administration of treatments and ineffective treatments have proved discouraging in the control of mastitis. However, milk prices are low compared to prices of other essential foods and commodities. The beef prices are high and it is an easy matter to realize a substantial salvage from a nonproducer and buy a replacement. This is a natural trend when mastitis treatment is too expensive and too often ineffective.

Intramammary injections of various kinds have become available recently for treatment of mastitis— ***Photo by Gates***

Ketosis or Acetonemia

The urine test for acetone bodies has proved a boon to dairy practitioners. Many valuable cattle have been returned to the milking line by timely and accurate treatment. However, I would caution against making a diagnosis of acetonemia on the strength of the urine test alone without checking for complications other than a dietary or metabolic disturbance. Too often animals reacting positively to the urine test for acetone fail to respond to sugar, chloral hydrate or hormone treatment and the owner later discovers on autopsy that an abscess in the thorax from a foreign body was the primary factor. Or a closer examination by the practitioner may reveal a nephritis or metritis that is complicating the picture. We still encounter chronic indigestions that are forerunners of ketosis. These may be due to improper feeds in quality or quantity. Chronic lung lesions and endoparasites are at times responsible for chronic internal disorders. Occasionally Johne's disease is encountered, giving a clinical picture of ketosis and often a positive urine reaction.

As experience accumulates I am prone to classify acetonemia in dairy cattle as a symptom, not a disease entity. It helps to avoid embarrassing situations in the matter of diagnosis and treatment.

Diseases of the Feet

Disturbances of the feet vary from mineral and vitamin deficiencies, founder, simple sprains, lacerations, foreign material to the common infectious pododermatitis or foot-rot. The latter is of economic importance from loss of milk and weight.

The common foot-rot can usually be remedied by curetting away the necrotic tissue and applying a drug of choice. If the lesions are confined to the external portion of the foot with no serious joint involvement, and there is an elevation of the temperature, 200 to 250 grains of sulfathiazole or sulfanilamide three times daily will restore the temperature and appetite to normal. Often no further treatment is necessary. Packs of sulfanilamide or sulfathiazole powder are beneficial. Phenolformalin packs are remedial or the entire foot may be soaked for one hour daily in a disinfectant solution. If there is joint involvement and the foregoing treatments fail, amputation of the affected claw is advisable. Rarely are both claws involved. Surgery should be resorted to early to be successful.

Shipping Fever

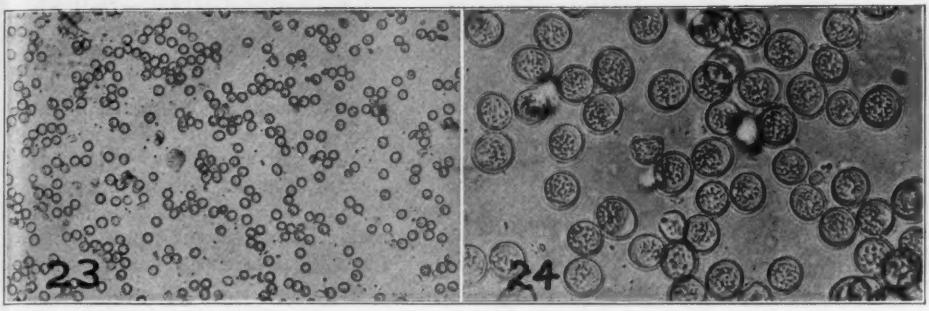
This subject is shop worn. Economic conditions, geographical location, climatic condition and type of animal (beef or dairy) each play an important part in the selection of treatment and in recoveries also. With the increase in value of the dairy cow more and better biological and pharmaceutical products can be used. Where it was once common practice to use a bacterin or nothing, it is now wise to administer ample doses of hemorrhagic septicemia serum for prevention and treatment. Repeat often if results are not forthcoming as the transfusion effect alone may keep the animal alive. Sulfanilamide or sulfathiazole may be used advantageously, either separately or together. Often it is possible to bring a temperature down to 102 or 103° F. with sulfanilamide but a normal temperature cannot be attained unless sulfathiazole also is used; or the reverse may be the case. It is good therapy to mix the two sulfa drugs half and half. From 200 to 250 grains three times a day is the average dose for a 1000-pound cow. Sulfapyridine may be used advantageously if expense is not an item. Often a large injection of neo-prontosil intravenously will reduce a temperature when other methods fail.

If the intestinal form of shipping fever, with a profuse diarrhea, is encountered, go easy on any internal drug treatment and give large doses of hemorrhagic septicemia serum or a mixed bovine serum containing antibodies of the varied intestinal groups of organisms.

Recent use of Doctor Farquharson's formula has given me most favorable results in handling difficult cases of pneumonia. However, as late as last spring, the use of intravenous potassium guaiacol sulphonate alone, did not secure desirable results. I have been fortunate in getting a veterinarian, experienced under Doctor Farquharson, who advised sulfa drugs in conjunction with the guaiacol treatment. Since then we have saved many animals which otherwise would have perished. One case, a 1200-pound cow showing a 104° F. temperature and with accelerated breathing and anorexia was given 125cc of the formula intravenously together with 250 grains of sulfanilamide three times a day. In 48 hours the temperature was normal and the appetite almost normal. The fast breathing subsided in 24 hours and did not return. Another case, a 200-pound purebred Holstein calf, valued in the hundreds of dollars, showed a very labored breathing, 104° F. temperature, complete anorexia—in short, the prognosis was grave. The calf was given 60 grains of sulfathiazole every six hours. At the end of 24 hours the temperature was still rising, so 15cc of the guaiacol formula was given intravenously and the sulfathiazole continued. On the following day the temperature was reduced to 102.8° F. and the breathing eased remarkably. There was some evidence of the appetite returning. Another injection of 10cc of guaiacol was given. No visible reaction was noticed on either injection but another 24 hours found

the calf with a 101.8 F. temperature and the appetite favorable. To date it has made an uneventful recovery.

Heretofore, in advocating the use of potassium guaiacol sulphonate there has been no mention of the use of sulfa drugs



Oocysts of Eimeria zürni, coccidium of cattle. Fig. 23, X100; Fig. 24, X400—*Photo by Biester*

in conjunction. This may have misled practitioners as either preparation alone is not nearly so effective as is their use together. When Doctor Farquharson's formula is recommended, the use of sulfonamides in conjunction should also be recommended for treatment in cases of pneumonia or shipping fever.

Differential Diagnosis

Ordinarily little difficulty is encountered diagnosing shipping fever or pneumonia. However, as most of our cases are on heavy springers or cows that have calved recently it is wise to check for other causes of a high temperature, short heavy breathing and loss of appetite. Animals that have calved recently should be examined closely for retained placenta and metritis or pyometritis. Or an inflamed udder may be causing the fever. Again, traumatic gastritis or endocarditis must not be overlooked. When the pressure of the calf is released following heavy labor an old gastric lesion may be broken down and cause a septicemia. Or foreign bodies that have not caused trouble previously may be forced through the stomach wall and diaphragm by the straining incident to parturition. Examine closely for a nephritis that may have been developing during pregnancy. Due to trucking and shipping and change of feed a toxic indigestion may ensue giving a typical pneumonic picture.

Internal parasites may closely simulate incubating pneumonia. I recall an instance where we had been troubled in a few "hot" ones in a certain barn and were on the lookout for more. Daily temperatures were taken and when an animal with a high temperature was found treatment was started immediately. Six young bulls brought into the herd recently were eating normally not withstanding they had an intermittent diarrhea. A temperature check revealed temperatures of 104 to 106° F. Hemorrhagic septicemia serum (80cc) was given and sulfanilamide started. In two days the condition was unchanged so sulfathiazole was added to the treatment. In two days more there was still no change except that one bull had developed a profuse diarrhea and was becoming weak and wobbly. On questioning the owner as to the origin of these bulls it was learned that they had been roughing it through the summer and were sheltered in an old chicken house. Their grazing had been on a small lot of old pasture. Microscopic fecal examination showed a heavy infestation of stomach worms and coccidia. As the rich new feed was given the animals could not handle it and severe digestive and systemic disturbances followed. Needless to say the shipping fever treatment was stopped immediately, the diet reduced and a worm and conditioning powder was added to the feed. A few weeks of this care corrected the condition although the blood picture was nearly ruined from the long continued sulfa treatment.

The Effect of Phenothiazine on Pregnant Goats and their Offspring

By ROBERT T. HABERMANN*
Washington, D. C.

THE most effective time to administer anthelmintics to control goat losses due to internal parasites is during the winter months. Pastures used for grazing in the summer and fall become heavily contaminated with infective nematode larvae and large numbers of these larvae are destroyed by the climatic conditions during the winter. The removal of parasites at this time not only frees these animals from the damages that would otherwise result from the parasites, but also protects them and their kids against rapid reinfection when they are put on pastures in the spring.

Winter treatment usually means the administration of anthelmintics to the pregnant goat and, since phenothiazine is effective in the removal of gastrointestinal nematodes from goats, the present observations were made to determine the effects of this drug on the pregnant does, on their kids and upon lactation.

Procedure

The observations were made during the winter months of 1941 and 1942 at the U. S. Department of Agriculture Beltsville Research Center, Beltsville, Md., on eight pregnant goats and three kids maintained by the Zoological Division. The does were of mixed breeding and were treated as near to parturition as possible in order to produce the maximum effect of the drug on them and their offspring.

In March, 1941, two pregnant goats and their kids (born during the test) were given daily 15 to 20 grams of phenothiazine in one pound of moistened grain over a period of 12 to 27 days. These treatments were given to each family of goats in a separate stall in the goat barn. A liberal quantity of alfalfa hay was fed also.

During the fall and winter of 1941-42 each of eight pregnant does was given from one to three therapeutic doses of phenothiazine. Some of the doses were administered in capsules and others were given in moistened grain or in a molasses-grain mixture, as described by Habermann, Foster and Hummon.[1] All of the anthelmintic treatments were administered to the individual animal except on one occasion when seven of the does were offered a moistened grain-phenothiazine mixture containing 25gms of the drug per animal. The treatments were administered to the animals on a permanent goat pasture. This pasture covered about one acre and had two A-type houses for shelter. The kids were born on the pasture and were not given any special care other than bedding down in the A-type houses. In this case also, the animals were fed a liberal quantity of alfalfa hay.

Observations

March 10, 1941, goat No. 12, weighing 109.5 pounds, was given 25 gm. of phenothiazine in a pound of moistened oats, bran, and corn. A healthy kid was born to her on March 25, 1941, fifteen days after treatment (Fig. 1). March 26, goat No. 12 and her kid were placed in a stall, and were given 15 gms. of the drug mixed with moistened grain. This mixture was not entirely consumed until the next day, but thereafter each daily drug mixture was eaten readily. With the exception of March 30, when no phenothiazine was offered, and April 6, when 20 gm. of the medicated mixture

Fig. 1. Goat No. 12 and her kid born Mar. 25, 1941, 15 days after treatment

* Bureau of Animal Industry, Agricultural Research Administration, U. S. Department of Agriculture.

[1] Habermann, Robert T., A. O. Foster, and O. J. Hummon, 1942. Treating pregnant ewes with phenothiazine. *No. Amer. Vet.*, 23, pp. 390-393.

was given, 15 gm. of phenothiazine, mixed in the moistened grain, were fed each day through April 8, 1941.

This goat and her kid showed no evidence of injury due to eating the medicated grain mixture. The health of both animals was excellent throughout the test. The supply of milk in the udder was ample at all times and there were no deleterious effects produced in the kid from consumption of the mixture. A 50cc sample of the milk was obtained from goat No. 12 April 7 and, after standing five hours exposed to the air, it turned a distinct red color, indicating that phenothiazine or its conjugated by-products were present in the milk being consumed by the kid.

April 24, 1941, two weeks after the medicated grain mixture was discontinued, the goat weighed 105.5 pounds and her kid weighed 17.5 pounds. The volume of red blood cells of the doe was normal (33.5% by hematocrit) and a spectroscopic examination for blood in the urine was negative.

Goat No. 11, weighing 138.0 pounds, was not given phenothiazine prior to the birth of her kid March 8, 1941. March 10 she and her kid were put in a stall and, beginning on this date, they were given 15 gm. of phenothiazine daily in a grain mixture. The drug was mixed with molasses and grain the first two days but thereafter it was given in moistened grain alone. A 15cc sample of milk collected March 11 appeared normal after exposure to the air for several hours. On March 12 a slight reddish tint was observed. March 13 there appeared to be little milk in the udder and a sample assumed a slight reddish tint after standing for one hour. The next day also the milk turned a reddish color. March 15 plenty of milk was present in the goat's udder. No noteworthy changes in the goat or her kid were noted until March 22, 1941, when a second healthy kid was born (Fig. 2). March 24 the doe's udder contained so much milk that the teats almost touched the floor. It was necessary to milk out by hand a considerable quantity before the kids could nurse. Throughout the rest of the experiment goat No. 11 had an ample supply of milk for both kids. Both kids were quite pink all over, when the administration of the drug was discontinued.

Goat No. 11 and her two kids remained in excellent health during the 27 days that the medicated grain was fed. The presence of phenothiazine in the grain and in the milk did not impair the appetite of either doe or kids. A spectroscopic examination of urine from the dam for the presence of blood was negative on April 1. April 8, 1941, the last day phenothiazine was administered, the volume of red blood cells was 29.5% and April 24, the hematocrit reading was 32.0. On this date also this goat weighed 138 pounds and her first and second kids weighed 21.0 pounds and 15.5 pounds, respectively.

TABLE 1. DATA ON EIGHT PREGNANT GOATS TREATED WITH PHENOTHIAZINE DURING FALL AND WINTER OF 1941-42

Goat No.	Dates of treatment	Quantities of drug given	Total quantity of drug given	Date of parturition	Days after final treatment to parturition	Kids born	Kind of birth
	1941-42	gms.	gms.	1942			
	Jan. 6	25*					
11	Feb. 23	35**	60	Mar 8	13	1F	Normal
	Jan. 6	25*					
12	Feb. 23	35**	60	Mar. 16	21	1M 1F	"
	Sept. 29	25**					
13	Jan. 6	25*	50	Feb. 5	30	1M	"
	Sept. 29	25**					
14	Jan. 6	25*	50	Jan. 5	98	2M	"
	Jan. 30	25*					
15	Jan.31	25**	50	Feb. 13	13	2M	"
	Oct. 13	30**					
	Jan. 6	25*					
16	Feb. 23	25**	80	Mar. 15	20	2F	"
	Oct. 13	30**					
	Jan. 6	25*					
17	Feb. 23	25**	80	Apr. 1	37	1F	"
	Oct. 13	30**					
	Jan. 6	25*					
18	Feb. 23	25*	80	Mar. 29	34	1M 1F	" ***

*Given in feed.
**Given in capsule.
***Found dead buried in snow after blizzard of March 29.

During the fall and winter of 1941-42 eight pregnant goats were given 25 to 35 grams of phenothiazine from one to three times during the latter part of their gestation period. Among these animals were included goats No. 11 and No. 12 whose treatment histories for the previous year have already been discussed. The important data and pertinent results are summarized in table I. It will be noted that the dates of parturition varied from 13 to 98 days after the administration of the final treatment, and that 13 kids were born to the eight does (Fig. 3). Five of the latter were given phenothiazine within the last month of

gestation and they gave birth to eight kids. Two of these kids were found dead, buried in the snow, on March 29; both of them were full term and well developed. Their

Fig. 2. Goat No. 11 and her two kids. The second kid was born 14 days after the first, during which interval the doe consumed 180gm of phenothiazine

dam showed no evidence of a toxemia neither before nor after parturition, and lactation was normal. These twins probably would have survived if they had not been born during this unusual snowstorm.

Discussion

In March, 1941, neither of the two pregnant does nor their kids suffered any ill effects from the medication with phenothiazine. Goat No. 12 and her kid were given 15gm of the drug daily until 185gm had been consumed, without any evidence of toxicity. Goat No. 11 and her first kid were given 180gm of the drug mixture before the birth of her second kid. The medicated feed mixtures were continued until 405gm of phenothiazine were given, and neither the dam nor the kids suffered any ill effects.

Repeated anthelmintic medication to seven pregnant does during the fall and winter of 1941-1942 was uninjurious to the does or to their offspring. Two therapeutic doses of phenothiazine administered between September 29, 1941 and February 23, 1942 to each of five animals failed to produce any untoward symptoms. Each of three pregnant does was given three therapeutic doses of phenothiazine October 13, 1941 and again January 6 and February 23, 1942, and no evidence of toxicity due to phenothiazine was found. The secretion of milk was not inhibited by the repeated anthelmintic treatments.

Summary

1. One goat and her kid were uninjured by the daily consumption of 15gms of phenothiazine mixed in the moistened grain for a period of 12 days. Another goat and her first kid, in an unusual case of superfe-

Fig. 3. Eight does and their 13 kids following treatment with therapeutic doses of phenothiazine

tation, were not harmfully affected by consuming 15gm of phenothiazine daily in a moistened grain mixture for 12 days and, following the birth of her second kid, she and her two kids were uninjured by consuming the medicated mixture for 15 additional days.

2. The milk from both goats that received 15gm of the drug daily turned a slight red color when exposed to the air for several hours. However, the presence of phenothiazine or its break-down products in the milk did not inhibit lactation or produce any deleterious effects in the kids.

3. The weights of the goats and their kids were normal throughout the test. No anemia was found in the mature females, and spectroscopic examinations of their urine for blood were negative.

4. Four pregnant goats were uninjured by the administration of two therapeutic doses of phenothiazine, and three pregnant goats and their kids were not affected by three therapeutic doses of the anthelmintic. Twins, born to one of the goats receiving three therapeutic doses of phenothiazine, were found dead buried in the snow. As both of these kids were full term and well developed, the drug was not considered responsible for their deaths.

5. One doe in 1941, and five does in 1942, were given therapeutic doses of phenothiazine within one month of parturition and gave birth to nine normal, healthy kids.

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War Emergency Stresses Need for Control of Nodular Worms*

As a war emergency measure, a special effort must be made to prevent the annual waste of great quantities of meat, and of sheep intestines used in making "catgut" for surgical sutures. Serious injuries to our armed forces sustained in actual combat and to civilians engaged in the production of war materials, create an ever-increasing need for surgical sutures.

Uniformity in size, tensile strength, and absorbability are special qualities of sheep intestines which make them particularly well adapted for use as surgical sutures. The conditions of war have stopped our importation of sheep intestines from Australia, and the chief difficulty with domestic production is the damage done by the nodular worm.

Native sheep in some of the midwestern states frequently suffer from nodular worm disease. The large sheep-raising areas in Northwestern United States, as well as in California, Arizona, and New Mexico, however, are almost free from the worm. Lambs purchased in these nodular worm-free areas by feeders should not be exposed to nodular infestation by resting the lambs enroute on contaminated pastures or by placing the lambs on ground used the same year for pasturing native sheep. Pasture rotation is always advantageous and an attempt should be made to use several pastures at different times during the year.

Phenothiazine has been found effective as a treatment for nodular worms as well as stomach worms in sheep. Each ewe should receive a dose of about one ounce, and each lamb should receive one-half ounce. The breeding flock should be treated for nodular worms in early winter after it is taken off pasture and in spring before going on pasture. Nodular worms infesting the pasture are generally killed by freezing during the winter. If treatment of the ewes is successful and most of the nodular worms are removed, the pasture will not be rapidly reinfected in spring and the lambs will remain relatively free of the parasite. Only the lambs kept over for breeding stock need be treated the following winter and spring, though occasionally it may be found advisable to treat all of the lambs. Different methods of administering phenothiazine have been successfully employed. (Phenothiazine does not mix with water alone.) Whole milk can be used instead to make a suspension of phenothiazine.

A community or area program is recommended in the suppression of round-worm parasites of sheep as a war emergency measure. Phenothiazine may be purchased at wholesale price in quantity for a large group of sheep raisers. Costs should be considered in terms of years, for a long-range campaign in the direction of parasite-free flocks.

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Drawing Blood

Fig. 1. An electric flashlight held under the ear makes the veins more conspicuous and facilitates locating the one from which the blood sample is to be withdrawn

Fig. 2. With the animal firmly held in a stanchion, the thumb of the left hand is placed upon the engorged vein and the ear held immobile. The bleeding needle is then slid over the thumb nail on into the vein

Fig. 3. The blood is allowed to run into a container which is a more convenient arrangement than is the use of a syringe

Samples from Swine

At the Short Course for Veterinarians at Purdue University in October, Doctor E. W. Kline, Thornton, Ind., demonstrated a method of inflating the principal vein in the ear of a hog which facilitates bleeding for blood samples. In the first place he took two No. 32 rubber bands and looped them twice over the ear at the base. Then he dampened the ear and with a flashlight held underneath the veins were more readily located. Doctor Kline used a 17-gauge needle and a container which he has found to be more satisfactory and speedier for securing blood samples than a small syringe such as is in rather common use by many veterinarians. He held the needle with his right hand and the ear with the left and steadied the needle against the left thumb nail.

Doctor Kline has found that success in bleeding depends about 90% upon proper restraint, so he constructed a stanchion for that purpose. He attaches it solidly at both sides in a doorway or gate of the ramp or pen in which the animals are confined. As each hog tries to escape it is clamped firmly about the neck and thus held in position to be bled. Utilizing this method and the stanchion, it takes a very short time to obtain blood samples from a large herd of swine.

The doctor cautions the operator to be sure to remember to remove the elastic bands from the ear or it will slough off.

Brucellosis in Swine

It has been estimated by the Public Health Service officials that about 50% of human infection (undulant fever) is due to *Brucella suis* and is the result of contact with infected swine on farms or in abattoirs. The frequent occurrence of the disease in man, in swine-raising localities, is indicative of the danger. There is no specific drug or other chemical agent known for the cure of the infection . . . attention must therefore be directed toward prevention of the disease. Where the infection is suspected, all animals should be subjected to the blood test. The disease in swine is self-limiting. Animals that have aborted may become immune or, even if they should harbor the infection, they carry their fetuses through the normal period of pregnancy. It is advisable, however, after the presence of the infection has been established, to eliminate all reacting animals and subject the rest of the herd to frequent blood tests until there is no evidence of a suspicious or reacting animal. This should be accomplished by adequate sanitary measures. "An ounce of prevention is worth a pound of cure" is sound advice in regard to brucellosis, and no possibility of preventing infection from gaining entrance to a normal herd should be overlooked.—Adolph Eichhorn in *Keeping Livestock Healthy.*

Cattle May Harbor B suis

Brucellosis in swine is a self-limiting infection due to *Brucella suis,* an organism closely related to *Brucella abortus,* which causes the disease in cattle. The infection in swine occurs because of contact with infected swine and surroundings. Cattle have been artificially infected with the swine strain and, when kept in the same yards with swine infected with *B. suis,* they have acquired transitory blood changes and during this period react to the agglutination blood test. As the question of the transmissibility of *B. suis* to cattle is frequently raised, especially in regard to the following of cattle by infected swine, it may be said that cattle may harbor the swine strain; it has been recovered from the milk of cattle, and artificially inoculated cattle have aborted as a result of it, with the recovery of *B. suis* from their genitals. But under natural conditions cattle seem to offer considerable resistance to the swine strain, and seldom contract infectious abortion because of it. However, if swine are known to carry the brucellosis organism it is safest to keep them away from cattle. . . . *B. suis,* it appears, is the more virulent of the organisms. Humans may become infected with this swine strain as a result of consuming milk derived from cows that have contracted this most virulent of the brucellosis group of organisms.—R. R. Dykstra in *Animal Sanitation and Disease Control.*

Swine Erysipelas*

By L. VAN ES**
Lincoln, Nebraska

TO prevent disease hazards in swine which multiply and require constant vigilance the service and co-operation of veterinarians is most essential in order that the demand for increased swine production may be met. Unless intelligent effort is directed toward its control, swine erysipelas will take a heavy toll. This infection has long been present but the extensive traffic in feeder pigs a few years ago spread the infection widely. The percentage of farms on which infection exists is still relatively small, and every precaution should be exercised to prevent more general distribution of the infection.

Nebraska pioneered in an experimental program to determine the feasibility of serum-culture vaccination for the prevention of swine erysipelas. Since the results were most satisfactory, the Bureau of Animal Industry of the U. S. Department of Agriculture soon adopted this plan of swine erysipelas eradication work in Iowa, South Dakota and, at the present time, in other states.

Swine erysipelas occurs in either acute or chronic form. In the acute form, often one or more hogs may be found dead. Others sicken and lameness, arched back and swelling of the joints are commonly present. Reddening of the skin with peculiar diamond-shaped spots is sometimes seen. High fever, ranging from 107 to 110° F. is present in the early stages. The temperature usually drops to 104 to 105° F. in 24 to 48 hours. Sometimes it is difficult to distinguish between acute swine erysipelas and hog-cholera. The symptoms and the post-mortem findings are much alike. Inflammation of the mucous membranes, congestion of the lungs, liver and spleen with small petechial hemorrhages of the membranes of the heart, kidney and bladder are present. The stomach is congested, the spleen is moderately enlarged, and of a bright red color, while in hog-cholera there is little or no change in the size, color or consistency of the spleen nor are sudden deaths so common.

The history of the infected herd is of assistance in distinguishing the disease from cholera. The time of year and information as to whether the herd has been immunized against cholera are important factors. In hog-cholera high fever usually continues for several days but in swine erysipelas it drops in 24 to 48 hours. Swine erysipelas is more prevalent in summer than in winter, and is more apt to attack suckling pigs than is hog-cholera. The acute form is often encountered and if not properly treated the pigs become stunted, develop enlarged joints and the disease becomes chronic.

Sometimes the erysipelas infection lingers in herds for months, and even for one or two years before deaths occur. Owners often fail to recognize the danger and allow diseased animals to remain in the herd, or they are sold into clean herds where they continue to spread infection.

In the chronic type the affected animals become unthrifty. There may be sloughing of the ears and tails. The most common symptom is enlarged joints.

Since 1928, the chronic form of swine erysipelas has increased in prevalence almost 300%.

If the disease has been present on a farm in recent years, all pigs should be vaccinated within one to ten days after they are farrowed. This is important. Some hog raisers plan to delay vaccination until all the pigs are farrowed with the result that the early pigs contract the disease and spread the infection. Sows should be bred to farrow on dates as close together as possible.

*Excerpts from presentation of L. Van Es, at the 23rd Annual Veterinary Conference, October 1-3, 1942, University of Illinois, Urbana, Ill.

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Observations on Cesarean Section in the Dog

By G. R. MOORE*
Manhattan, Kansas

CESAREAN SECTION is one of the classical operations, having been periodically described in literature for over two thousand years. It is an operation that every practitioner is called upon to perform at some time or other, usually when he is least prepared. The fact that many veterinarians are hesitant about attempting a cesarean is evident from the large number of dystocias sent to our clinic by colleagues who do not care to perform the operation themselves. The successful completion of a cesarean section is a source of much satisfaction to the operator, for he has proved to himself that he is a good surgeon.

A cesarean operation is usually indicated in the dog as soon as dystocia becomes evident. In a small percentage of cases, the dystocia can be relieved by digital manipulation or by means of forceps, but usually this succeeds only in infecting and traumatizing the uterus and in mutilating the fetus. It is frequently impossible to remove all of the pups *via* the birth canal and the prognosis of the subsequent operation becomes more grave in proportion to the amount of tampering that precedes it.

In our clinic dystocia occurs commonly in Bostons, cocker spaniels, Scotties, Pekingese, and English bulldogs, and rarely in the other breeds. We make it a rule to operate on these breeds if they have labored for more than four hours without progress. Quite commonly cases are presented that show no symptoms of labor. Examination and a careful consideration of the history usually reveals that the patient has labored unsuccessfully until fatigue has caused complete uterine inertia. In some of these cases the owner reports that the bitch's time is up but that she has not labored at all. Probably what has happened is that she tried to whelp during the night without being observed and that by morning she had given up. These cases must be distinguished from those in which the owner is mistaken about the date and expects parturition before it is actually due. Examination of the degree of dilation of the cervix will quickly differentiate between the two conditions. In all cases, as soon as dystocia has been diagnosed and cesarean section decided upon, the operation should be performed at once. Each hour of delay increases the likelihood of death of the fetus, and of fatigue and toxemia to the mother and, in general, makes the outcome more hazardous.

Before beginning the operation the temperature, pulse, respiration, condition of mucous membranes and amount of dehydration should be noted. If there is any suggestion of shock (subnormal temperature and feeble pulse) or toxemia (dehydration, congested mucous membranes) it is best to administer intravenously 10 to 20cc of a 25% dextrose solution before beginning the operation. One hundredth of a grain of atropine sulphate subcutaneously will strengthen the heart and lessen the danger of shock.

Some operators choose the flank incision for their cesarean sections to avoid disturbing the mammary glands. They point out that the pups in nursing do not contaminate the wound as they do when the median line incision is used. However, this method has some serious disadvantages. It is necessary to separate the abdominal oblique muscles which are used in defecation and urination and to some extent in respiration and locomotion. The constant mobility of this area is not conducive to the rapid healing which is essential if an unsightly scar is to be avoided. The uterus is somewhat more accessable through the median line and there is less hemorrhage. If modern suturing methods have been used, a bandage is entirely unnecessary, and the mammary apparatus will not have been disturbed in any way. In our cesarean sections, healing is always complete by the fifth or

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sixth day. Because of these advantages of the median line operation the flank operation has largely fallen into disuse in recent years.

Pre-operative preparation consists in securing the patient in dorso-recumbency, shaving the entire ventral surface of the abdomen from the xiphoid cartilage to the pelvis. The operative area is then washed clean and dried. Next a pack soaked in alcoholic sublimate (1-1000) or some other reliable skin disinfectant is applied and left in place for ten minutes or longer. Just before beginning the operation the pack is removed and the area is painted with a drying antiseptic such as tincture of iodine.

The following sterile equipment should be at hand:

1. One Bard-Parker knife.
2. One Groove Director.
3. Several hemostats.
4. One atraumatic suturing needle.
5. One half-curved, cutting-edge needle.
6. One straight, cutting-edge needle.
7. One pair of needle forceps.
8. Surgical scissors.
9. Two cover cloths and four towel clamps.
10. Several sterile gauze packs.
11. One tube of No. 0, 10-20, chromic catgut.
12. One tube of No. 0, plain catgut.
13. One length of silk-worm gut or other dermal suture.
14. Sterile rubber gloves.

The surgeon should scrub his hands thoroughly with soap and water and use his favorite method of disinfecting them. The author uses a pan of warm water to which tincture of iodine has been added. The water takes up the alcohol and liberates nascent iodine. The hands are submerged until they are stained a light lemon color. This stain disappears in about an hour. Sterile rubber gloves are a valuable aid in aseptic surgery but should not be used unless the operator is adept in their use, since otherwise the advantages will be more than offset by the bungling attendant on their amateur use.

There is no satisfactory substitute for ether anesthesia in cesarean sections. Pentabarbital-sodium and the other derivatives of barbituric acid anesthetize the fetuses and cause a high rate of mortality. The bitch is unable to care for the puppies for several hours. In this operation mortality is much higher in bitches that have been anesthetized with barbiturates than in those in which ether is used.

We drape the abdomen with two cloths,

Ether anesthesia is preferable as an anesthetic for a cesarean section in a dog

one on top of the other. Then after the fetuses have been removed the top one can be removed and the under cloth provides a clean surface on which to complete the operation.

The incision should be exactly on the median line and should be extended from one-half inch posterior to the umbilicus backward about two inches. At this point, it is advisable to explore the location of the most accessible fetus and to extend the incision backward or forward as the case requires. In most cases, it is best to extend it anteriorly up to, or past, the umbilical scar. A common error is to extend the incision so far posterior that the bladder protrudes, causing no end of inconvenience. It is well to remember that, due to the distention of the abdomen, the pelvic organs are somewhat farther forward than usual. Allowance should be made for this in locating the incision.

Having completed the laparotomy, and having pushed the omentum out of the way to expose the uterus, the posterior part containing the fetus nearest the pelvis is grasped and elevated through the abdominal opening. Before opening the uterus, we roll the patient over on her side to prevent the intrauterine fluids from running back through the abdominal incision. This is an

important point, neglect of which is probably one of the most usual contributing factors to fatalities in this operation.

The uterine incision should be located as near the bifurcation as possible and should avoid major blood vessels. However, if the bifurcation is not readily accessible, do not hesitate to make an incision in each horn. An extra incision is not as harmful as excessive manipulation of the uterus. If the

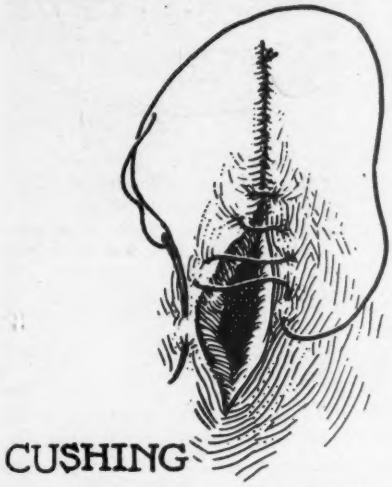


FIG. 1.* CLOSING UTERINE INCISION
The first row of sutures are being placed. Note that the parietal surfaces are being drawn together so as to roll in the cut edges of the uterine wall

incision is sufficiently large, the fetus surrounded by its placenta, will protrude through the opening where it may be grasped, and if gentle but firm traction is applied, the zonular placenta will peel loose from the uterine wall. An assistant can then remove the placenta, crush the umbilical stump and care for the new born puppy. The remainder of the fetuses should be removed in the same manner.

As soon as the pups have been removed from the placenta, they should be dried with a rough towel. If weak, they should be treated rather roughly and massaged vigorously. They should be placed with their mother and encouraged to nurse just as soon as she has recovered from the anesthetic enough to care for them. The act of suckling the young stimulates the pituitary gland, the hormone from which inaugurates involution of the uterus—a prime essential to an uneventful recovery.

Usually it is not necessary to withdraw the whole uterus from the abdomen in order to empty it. Some operators remove the complete uterus from the abdominal cavity before opening it. This is not a good procedure, since it increases greatly the chances of shock and infection.

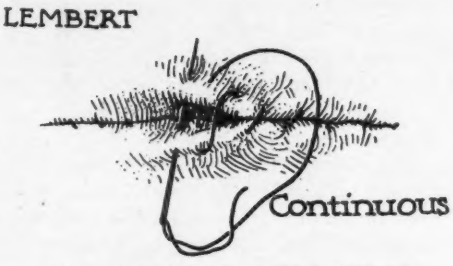


FIG. 2. CLOSING THE UTERINE INCISION
A second row of sutures is placed over the first

Occasionally it will be found difficult to work a fetus down to the primary incision for removal. If this occurs, it is better to make a second opening than to manipulate the uterus excessively since properly closed uterine wounds heal with great rapidity.

If at all possible, the placenta should be removed. An empty uterus will contract rapidly, but one containing fetal membranes may remain dilated for several days. Pyometra frequently follows failure to remove the placenta.

When the uterus has been emptied, all exposed parts are cleansed and the outer cloth is removed, providing a clean area on which to complete the operation. The uterine incision is closed with a continuous Lembert or Cushing suture (Fig. 1), using No. 0 or No. 1 plain catgut and an atraumatic needle. Experience has shown that it pays to take neat, small stitches so that the parietal surfaces are nicely approximated. Recently the author has been using a double row of Cushing sutures (Fig 2). That is, when the end of the incision has been reached, the direction of the suturing is reversed and a second row of sutures is

* Suture illustrations, are by courtesy of Johnson and Johnson.

placed over the first, so as to end over the point where the suturing commenced. If the operator begins at the posterior end of the incision and sutures forward and back, tieing the end to the beginning, all of the suture will be buried except the knot at the posterior end. The formation of adhesions is thus kept at a minimum. Careless closing of the uterine incision invariably results in extensive adhesions, making dystocia inevitable in subsequent parturitions.

If the uterus becomes soiled it may be advisable to rinse it with warm normal saline solution before replacing it in the abdomen. The use of antiseptics for this purpose cannot be too strongly condemned. They do more harm than the bacteria they kill would do. Successful abdominal surgery is based on asepsis, not antisepsis.

Having returned the uterus to its bed, the primary incision should then be closed. Since the puppies in nursing will disturb this area continually and since the incision is relatively large, it is imperative that this be done neatly and carefully to secure primary healing. The author prefers to close the peritoneum and muscle with a single row of continuous sutures using No. 0 or 00 chromic gut. This suture should be interrupted twice so that the incision will not open if the suture should break. Care should be taken to see that the edges of the peritoneum are approximated accurately. If this is not done, adhesions of the uterus to the muscle wall will form, resulting in continual discomfort to the patient and insuring dystocia at any subsequent parturition.

The skin incision should be closed with silk-worm gut by the subcuticular method, (Fig. 3) and the end of the suture anchored about one-half inch beyond the end of the incision. A cutting edge, straight needle should be used, the stitch entering the skin from the under side, penetrating the subcuticular layers only and coming out also from the underside. The stitches on the opposite sides of the incision should be so spaced as to alternate when the wound edges are drawn together. Each stitch should be about one-fourth inch in length and about one-eighth inch from and parallel to the cut edge of the skin. By this method the edges of the skin can be approximated very accurately and in half an hour the wound is completely sealed by congealed serum.

When the end of the wound has been

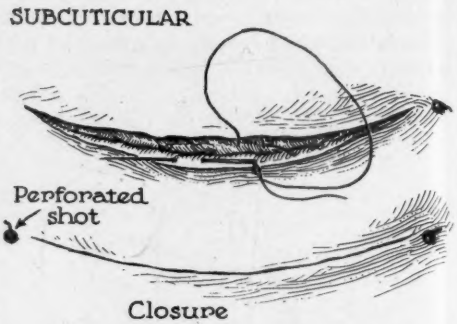


FIG. 3. CLOSING THE SKIN INCISION BY THE SUBCUTICULAR METHOD

If perforated shot are not available knots in the suture will do as well. This method of suturing does not leave a scar

reached the suture should be pulled snug and anchored as at the beginning. With this type of suture, healing of the skin is complete enough to remove the suture in three or four days. This is accomplished by cutting it at one end and pulling it out from the other.

Since the mammary gland is entirely subcutaneous, suturing as described above avoids wounding it in any way. The wound seals in a few minutes and since there are no exposed sutures to become infected, bandages are entirely unnecessary.

If facilities are available, the bitch and her pups should be hospitalized for four or five days. Little after-care should be required other than to check the temperature daily. If it has risen above 102.8° F. sulfanilamide in appropriate dosage should be administered four times a day until the temperature is normal. Too often these cases receive entirely too much post-operative care. Occasionally, where toxemia is pronounced, dextrose solution, physiological saline, or a blood transfusion should be administered, but such treatment is not often indicated. Our policy is to try to do a good, clean operation, make the bitch and her family as comfortable as possible and then leave them alone.

Domestic Rabbits in the Food for Freedom Program

FOOD, especially meat, is of major importance in times of national emergency, and the domestic rabbit may well replace rationed meat, thus releasing such meat for the armed forces and for exportation to our Allies. It will also add variety to the family diet throughout the year.

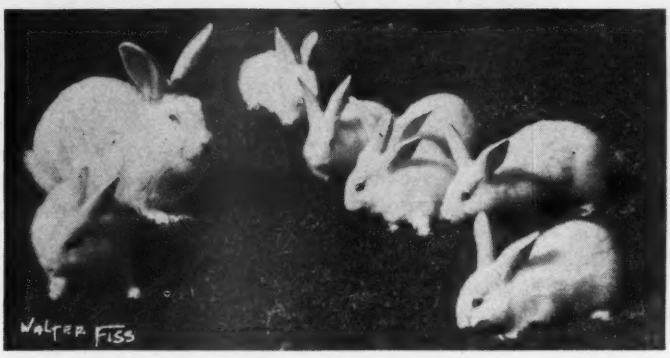
Having no objectionable features and requiring little space, rabbits are being raised more and more extensively in every State in the Union. They may be kept in the city backyard as well as on the farm. Their hutches can be constructed of scrap materials at little or no cost. Clean table scraps, garden waste, lawn clippings, palatable weeds, and small limbs trimmed from fruit trees may be utilized to supplement their regular rations.

Rabbit meat is quickly produced—only 90 days from mating until the young are ready for the table. It is also economical as only 4½ pounds of feed are required during this period to produce each pound of live weight.

Three or four does and a buck of the medium-weight or heavier breeds will furnish the average family with all the rabbit meat that it will use. Properly developed and finished fryer rabbits weighing 3¾ to 4¼ pounds will yield dressed carcasses of 2 to 2¼ pounds, about 77% of which is edible. Mature does and bucks that have served their period of usefulness may also be conditioned and used for food.

Practically all breeds of domestic rabbits are satisfactory for producing meat for home use. The medium weight and larger breeds—New Zealand, American, Beveren, French Silver, Chinchilla, and Flemish Giant—are best suited in size and conformation to the production of meat and fur. White skins usually bring higher prices.

For foundation stock, the breeder may start with young rabbits just weaned or with mature animals. If young rabbits are selected, the breeder may become acquainted with the animals and their habits by the time they are ready to go into production.



New Zealand white doe and litter at the U. S. Rabbit Experiment Station, Fontana, California—Photo *Fish & Wildlife Service*, U. S. Dept. of the Interior

Hutches should be made so that they can be kept clean conveniently and will provide for the comfort and easy feeding of the rabbits. If portable, they can be easily moved under trees for shade and near or in buildings for protection. The standard hutch is 4 feet long, 2½ feet wide, and 2 feet high. Floors of the self-cleaning type may be made of slats, preferably hardwood, 1 to 1½ inches wide, spaced ⅝ inch apart.

Mangers should be large enough to hold a 24-hour supply of hay and so constructed that they can be filled without opening the hutch doors. Feed troughs of the drawer-type placed under the hay mangers are convenient for feeding and cleaning and will catch and save any shattered hay leaves. Over the feed trough, guards should be

spaced 3 inches apart to prevent young rabbits getting into it and contaminating the feed.

A two-compartment hutch can be constructed economically by using chiefly crating or other scrap material.

Inexpensive two-compartment hutch. The corner pieces extend twice as long as pictured. These are braced to support the hutch on the ground—Photo. *Fish & Wildlife Service*, U. S. Dept. of the Interior

Does and bucks of the small breeds may be mated when five to six months; medium-weight breeds, when six to seven months; and Giant breeds, when nine to twelve months of age. For each 10 breeding does one buck should be maintained.

Does carry their young 31 to 32 days. Twenty-seven days following mating, a nest box should be placed in the hutch, bedded with straw. Before kindling the doe will usually arrange the nest and line it with fur from her own body or some may be plucked from her sides, hips, or underline as it is easily removed at this time.

The litter should be weaned at about two months of age and the doe rebred.

The sex of young rabbits can be determined easily by pressing open with the thumb and forefinger the sexual aperture just below the anal opening. In does, a longitudinal slit is observed; in bucks, the opening is round and the male organ can be made to protrude.

As rabbits consume a variety of feeds, there can be considerable latitude in selection. A ration may be made up of home-grown grains and hays. Whole grains—oats, wheat, buckwheat, sorghum, barley and rye —are palatable and desirable but should be ground unless mixed with a fine meal, in which case the mixture should be dampened slightly before feeding, to prevent the meal being wasted by settling to the bottom of the feed trough.

Since the grains have similar feeding value they can be substituted one for the other, pound for pound, without materially changing the nutritive value of the ration.

A good quality hay should be kept in the mangers at all times. The legumes are more desirable than carbonaceous hays and should be used when available. When carbonaceous hays such as timothy, bluegrass, Bermuda, etc., are fed they should be cut when still growing so as to contain more food value. Rabbits should have green feed or root crops such as carrots, turnips, sweet potatoes, sugar beets, etc., either fresh or stored. They should be fed in the hay mangers or feed troughs. Green feeds or root crops should not replace entirely the grain, household waste, and hay ration except in the case of mature rabbits that are not in production.

Water should always be available for rabbits except during freezing temperatures, when it should be provided once a day just before feeding. They should have access to a block of white salt at all times.

When three weeks of age the young will usually begin to eat solid foods, and then the doe and litter should have all the grain or grain and household scrap mixture they will consume each 24 hours.

The development and finish of young rabbits may be hastened by a balanced ration containing plant protein supplements—soybean, peanut, or linseed—in meal, pea-size cake, or pelleted form mixed with the grain. They may be interchanged pound for pound without materially altering the food value of the ration.—Excerpts from *Wildlife Leaflet* 218, by Geo. S. Templeton, Director, U. S. Rabbit Expt. Sta., Fontana, Cal.

Autobiography of a Veterinary Practitioner

By E. T. BAKER, Moscow, Idaho

XII

Conducting a Practice

VETERINARY practice is merely the business of rendering various services to owners of live stock. It may be further classified into the following divisions:

1. Treating sick or injured animals.

2. Prevention and control of disease outbreaks.

3. Collecting in enough money to carry on the business and show a reasonable profit.

4. Building up confidence among one's clients, so they have faith in the practitioner's ability, no matter what the final outcome of the case may be.

All high sounding theories regarding the altruistic aims of our "noble profession," are just so much bunk. Those of us in actual practice know how much good we do, and how much free service and advice we render to the public. In many instances this kindness returns to us after many days. Here are a few examples:

I have a badly infected eye, and drop into the office of one of the local physicians. He treats it, and we visit awhile. As I get up to leave I ask:

"Well, Doctor, what's the damages?"

With a smile, he waves his hand in a friendly gesture and answers:

"Just as much as you charged my little girl when her Shetland pony was sick."

I go down to the notary public to make out my Harrison anti-narcotic affidavit, and ask:

"How much, Bill?"

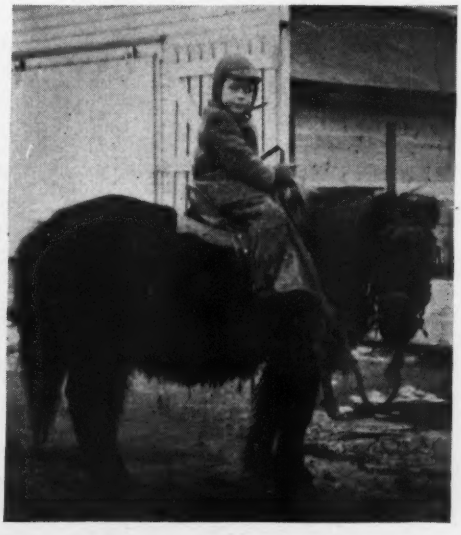
He growls: "Git th' hell outa here. Did you stick me when you yanked them porcupine quills outa my pup's schnozzle?"

We sell a little property, and ask a lawyer friend to fix up the abstract. I ask the bill, and he smiles:

"Well, Doc, do you remember when you gave me that free advice on the Ayre cattle case? Here's where I get even with you."

And so the days and years pass by, and we pile up dividends of good will and gratitude among our friends, clients and neighbors. The old saying of "Cast thy bread upon the waters and it will return to thee in many days" it just as true today as it was two thousand years ago.

Perhaps I have performed too much free work, but we have prospered in spite of it,



and the fact that we have lived in one community for twenty-nine years shows that it does no harm to one's general reputation. Coming to the west when it was young, I imbibed the old pioneer spirit of being open hearted and free handed. I do not say this boastfully, but merely because it was the western custom of thirty years ago to leave everything unlocked. If a passer-by came to a cabin around meal time, and no one was home, he walked in and cooked a meal for himself. If he carried a pack, he used his own stuff, or left the equivalent of what he ate. People were poor, as a rule, and very neighborly. No one was ever turned away hungry. Today, we must sadly admit, "them days are gone forever."

On Saturdays most of the farmers leave their work and come in to town

A practitioner soon learns who are good clients, and those who only call up as a last resort and "belly-ache" when the patient dies. He often forgets to put down a call on his books for some poor person, but makes this up on the mean or stingy. Therefore, conducting a practice is a complex business, and no two can be run alike. In order to be more personal, I will describe some of the details of my own practice.

Being on the Job

When a client wants a veterinarian, he "wants him right now." To a great extent I can determine what time of day, week or month I will be the busiest, barring disease outbreaks. Also, we all know how important a part good or poor growing season, long dry or wet spells, value of various kinds of live stock, and the general economic condition of the country, plays in practice.

Year in and year out the same procession of diseases, injuries and infections occur among our live stock. It is merely a constant parade of birth, life and death. There is always plenty of work to do, but the amount of our income largely depends on the financial ability of the owners to call us and to pay their bills.

Long experience has taught me what to expect and when. As a rule, my busiest day is Tuesday, and in early morning, five to nine, the majority of calls occur. From then on, as a rule, things are fairly quiet until about four in the afternoon. During this interval, farmers may drop in for some free advice or medicine, and it gives me a chance to go around the various meat markets. In the late afternoon, they start home

to do their chores and may find a sick animal. I have done enough missionary work among my clients so that my night calls are few and far between. The great majority of night calls, in my practice, are "dead ones" when we are called.

On Saturdays, most of the farmers come to town, and this is one of the quiet days as far as practice is concerned. However, it is a good time to stick around home, for many drop in to pay bills, make arrangements for some future work, or get medicine. This is one reason I emphasize the importance of having a comfortable home, for if I had to loaf around a stuffy office, I would probably be absent a good deal of the time, and miss just that much business.

My telephone number is extremely easy to dial and to remember—2323. My home and office is only one block from the center of town, but on a residential street, and I can be very easily reached. People get in the habit of coming to me for veterinary information instead of going somewhere else. One's location, therefore, is almost as important as being on the job at all times.

Suppose your house was on fire, and when you turned in an alarm, the operator would sweetly reply: "Sorry, but the boys are out playing golf. Keep your fire going until they get back around noon."

That is about what your clients think when they cannot get you in a hurry. If you are not prospering as a practitioner, analyze the situation, sparing no details. See how available you are to your clients. It might open your eyes to a few things!

Keeping Supplies on Hand

An experienced practitioner knows that when an owner of live stock wants them doctored he wants it to be done "right now." If a logging outfit with 150 horses takes a notion to have them immunized against influenza or encephalomyelitis, it must be done immediately. If a farmer with 100 hogs calls up just after breakfast, and wants them vaccinated, one should be there before nine, for he may change his mind by noon.

With such good service from the various branch houses available, I can now call up and have almost anything I may need within a few hours but, to be on the safe

It pays to keep supplies on hand and equipment well cared for

side for these emergency calls, I keep a sufficient quantity of commonly used biologics and other supplies on hand. Keeping in close touch with the live stock situation in my territory gives me ample time to prepare for the out-of-the-ordinary infections. When infectious pneumonia is "popping up" around over the country among sheep, I lay in a large supply of hemorrhagic septicemia bacterin, serum and aggressin. When influenza sweeps over horses, or blackleg appears among calves, I am prepared for it.

Except for blackleg vaccine, I never sell any biologics to the farmer, or loan him a syringe. The blackleg situation is different than any other disease, and it often leads the stock owner into using other biologics. Some veterinarians encourage this practice, as it saves them the bother, and they make a little quick profit but, in the long run, it will ruin a practice.

As I treat around 150 cases of milk fever a year, I keep plenty of calcium gluconate and dextrose on hand, for it keeps well, and costs less when purchased in large quantities.

On the whole, six months' supplies are kept on hand. Capsules, oils, bandages, cotton, and the like are bought about twice a year. Every six months my stock is checked and the old stuff separated so as to be used first.

It would be almost impossible to explain

to younger readers how our modern supply house now fills a vital need in our life. For example, when I began to practice in 1913, I had to send back to Manhattan, Kansas, for hog-cholera serum. After wiring for it, five days elapsed before it arrived, and needless to say, most of the would-be patients had passed away before it came. Several of the larger pharmaceutical houses had a small veterinary department under the supervision of some drug clerk who did not know much about our actual needs. It would be much like putting me at the head of a department of human surgical instruments. There would be quite a mix-up before the end of the day.

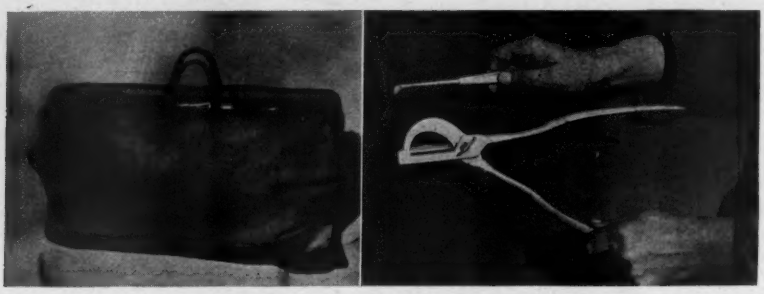
I hope St. Peter has kept no record of my remarks when I opened up more than one package, and found exactly the things I had not ordered. When a 10cc. hypodermic syringe with four 18G small slip needles were ordered, the chances are a 30cc. syringe with two 14G large slip needles would look up at my surprised and sometimes purple face. Usually, the supplies urgently needed would be missing with the gentle legend: "Back Ordered." Yes, "them was the days of real sport."

The war of 1914 also taught me the advantage of keeping a reasonable supply of essential drugs on hand. Those who had to purchase carbolic acid, camphor, cotton, potassium permanganate, glycerine and many other supplies, will not soon forget the price they had to pay. As this is written in June, 1940, no great advances have taken place, but only the future knows what is in store for us.

One can profitably read the parable of the five foolish virgins and the five wise virgins, with a mental reservation as to where ten virgins might be found. But the lesson is a good one, even now.

Care of Equipment

Those of us who have been around much, realize the terrific loss in equipment due to neglect or careless handling. My training, from earliest childhood, taught me to take care of whatever I had. Thus, in winter, many busy days were spent in "the old shop" oiling harness, lubricating farm machinery and repairing the wear and tear of the last season. When spring came, everything was ready, and the same applied to our clothing, shoes, kitchen utensils and all household equipment. We did not have much money to buy things in those days, and we took mighty good care of what we had.



A large grip holds the castrating outfit. The knife and emasculator are my preference

My instruments are thoroughly oiled from time to time, and about once a year all my leather goods are gone over with pure neatsfoot oil. I have several grips that have been in use over twenty-five years, and even a dose syringe will last for years, when the leather plungers are given a little neatsfoot oil at regular intervals.

Some people are naturally rough on their equipment and nothing can be done about it. As I do not have to purchase replacements for this class of men, there is "a lot of worrying I do not do about it," as the Dutchman said.

Handled with care, one's equipment should last for years. I always keep in mind a dollar saved is just the same as going out in the mud and making it.

(To be continued)

Castration Standing

The article on castration in the September issue of Veterinary Medicine, page 384, written by C. D. Michael, interested me but I cannot understand the perfect faint the Doctor speaks of having occurred in his first standing operation, unless the twist of the twitch and the instantaneous incision completely dumbfounded him.

When I started practice in my present location, 44 years ago, my greatest drawing card was the castration of colts in the standing position. No one else in Western Kentucky operated upon them in this manner.

It was the custom in those days for veterinarians to do some advertising. My advertisement informed prospective clients that there would be no charge for the operation if it were not finished in two minutes.

My first work in this line (and it was all standing) was in 1893, while attending the North Dakota Agriculture College. It comprised assisting T. D. Hinebaugh, State Veterinarian of North Dakota, and ultimately much of this work fell to my lot. Of the almost numberless colts I have castrated standing, not one has fallen. However, colts with diseased testicles, those that were high flankers and ridglings were always cast.

In the past month a call came 30 miles away to castrate two saddle stallions, three and six years of age. The owners did not want them strained by casting. (The older the horse, the easier the job.)

My advice to young practitioners when operating is:—Never touch the animal with arm or shoulder. Have an assistant turn the colt's head slightly toward the operator. Although it is impossible for the colt to kick the operator, he may step, and with his head turned as directed, the step is taken away from the operator. Begin giving daily exercise twelve hours after the operation. Continue it for three or four days and there will be no swelling.

Although past 70 I have yet to lose my first case operated in this manner. Knock on wood! Thank you, it has already been done!

C. G. WARNER

Paducah, Ky.

Protection for the Ears

Here is a practical pointer I would like to pass on. Probably others have used it for some time but it was new to me. In many instances we have difficulty with fly bites on the tip of the ears on prick-eared dogs. I have used about everything I have ever heard of without complete success.

The other day a part German-Shepherd and Collie came in to be spayed. On the tip of the ears and down for about four inches Scotch cellulose tape was neatly affixed. This tape is made by the Minnesota Mining Manufacturing Co., Saint Paul. Healing takes place nicely and the dog can not get the tape off. It is transparent and one can see just how the ears are doing. Or, one can place the tape on the ears before they are bitten to protect them. It looked good to me.

C. L. SANDERS

Dayton, Ohio

Mineral Deficiency in a Cow

April 6, 1942, a five-year-old grade Hereford cow, unable to stand was brought to the veterinary clinic of the Kansas State College. Anorexia, loss of weight and a slight progressive "stiffening" had been noticed for several weeks by the owner. The patient had been recumbent for two to three days—her hindquarters completely paralyzed. Ration for the previous year had consisted of pasture grass supplemented by poor quality sorghum silage of low grain content. Some white corn had been fed since January 1. Conception had occurred approximately eight months previously.

Both hind legs were extended forward beneath the abdomen and somewhat abducted. Examination indicated reduced muscular tonus and depression. The pulse rate was 88 per minute. Rectal palpation failed to disclose any fracture, luxation, tumor, or other possible cause for the condition. Placing her in slings caused severe pain. She was unable to move her hind legs, much less support weight on them. Albuminuria was revealed upon urinalysis. Three consecutive daily blood counts gave an average white cell count of 19,900, indicating a leucocytosis, a provisional diagnosis of posterior paralysis was made.

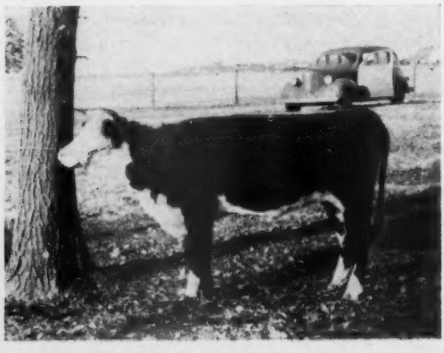
The next day a calcium and inorganic phosphorus determination of the blood serum showed a content of eight milligrams of the calcium and 3.07 of the inorganic phosphorus per 100cc.

Treatment consisted of daily intravenous administration of from 250 to 500cc of 20% calcium gluconate solution and 20 grams of dibasic sodium phosphate (Na_2HPO_4). On the fourth day an ounce of U. S. tonic was given. The cow died during that night.

Postmortem findings furnish the most dramatic evidence of disease. The surfaces of both sacro-iliac articulations were completely separated, presenting a yellow, roughened exudate about three sixteenths of an inch thick over more than half of the areas. Porosity about the periphery of the acetabulum, as well as a sponge-like appearance of the outer edge of the involved sacrum and ilium was evident. The right uterine horn contained a large emphysematous fetus.

The necropsy thus revealed the cause for the inability of the cow to stand, namely the sacro-iliac separation. Inasmuch as there were no discoverable antemortem lesions pointing to mechanical factors as being responsible, and the blood calcium and inorganic phosphorus content fell markedly below the average respective ranges of 9 to 12 and 2.3 to 9.6 milligrams per 100cc of bovine blood serum, a hypocalcemia-aphosphorosis is considered the basic factor involved.

A deficiency of the minerals in the diet may have been partially or directly responsible for the death of the fetus in utero. Advanced gestation would be a likely contributing factor in the separation of a fixed joint already weakened by a prolonged depletion of essential minerals. Increased weight on the abdominal floor would correspondingly place greater strain on all verterbral articulations.



The calcium and phosphorus content of the feeds which comprised the cow's diet are low according to Morrison and Henry.

It seems logical to assume that, had a moderate quantity of good grade alfalfa, either pasture or hay, been fed, this condition might not have developed.

RICHARD A. SHEA.

Oklahoma City, Okla.

* * * *

New Year's Day, 1943

Some of the readers of VETERINARY MEDICINE have expressed a desire to know what the other fellow is doing. I am included in that group, but feel that I too should contribute something of interest. Here is something of what I was doing on January 1st of this new year.

A call was received at 5:30 a.m. from a farmer to hurry out to see his cow for he thought she was dying (she had been sick for over a week but he didn't call a veterinarian till he was sure she would die otherwise). A quick trip was made and on arrival the following was found:

The cow was down on her right side in acute spasmodic pain. The respiration was fast and shallow and she kept running her tongue in and out of her mouth, scooping up anything near. It kept one man busy keeping her mouth clear. She was well blanketed and bedded (my thermometer was accidentally dropped and it took five minutes to find it in the straw). Her temperature was 102° F. The history of the case included lack of appetite, chronic mastitis one quarter, heavy milker, extensive loss of flesh but holding right up in production of milk even to the night previous to my call, bowels sluggish and a normal calving a month before.

An intravenous injection of 500cc of 50% dextrose and 250cc of calcium boro-gluconate was made. I contrived to get the patient to a sternal recumbent position with her weight shifted to the left side and im-

mediate relief was evident. All symptoms of toxemia and the painful convulsions ceased and the animal looked quite recovered. Needless to say, the farmer was profuse in his praise while I was surprised at such a sudden response. The next step was to secure evacuation of the bowels, so a purgative in small divided doses was prescribed, a guarded prognosis was given with instructions to call me at 3:00 p.m. if the cow were not progressing favorably.

When the call came, the animal was still down but resting quietly. The temperature was still 102° F. A test of the urine was made and acetone bodies were found in sufficient quantities to justify a positive diag-

Foreign bodies from one cow

nosis of acetonemia. The dextrose injection was repeated and chloral hydrate prescribed in suggested dosage. At this time the farmer even offered to provide me with butter for the rest of my days if she pulled through. She did look as though she would be alright, however, a guarded prognosis was again given as I did not dare to trust my good luck too far.

The next day the report came, "cow still down and grunting as she breathes." The same prognosis was repeated with instructions to continue the dextrose and more chloral hydrate if pain were evident. No more chloral hydrate was needed as she died that same evening. On postmortem examination, conducted by the farmer, a three-inch piece of wire was found.

My client is satisfied and absolutely sure that no one could have done anything more for the cow, or made her death more painless—but it seems I don't get the butter!

Now—what are the rest of you doing?

NORMAN GARLICK

Tacoma, Washington

Veterinary Service in Tasmania

While making some research investigations in Australia recently, a Tasmanian veterinarian, whom I met at the University of Sydney, told me that Tasmania has nationalized its veterinary service. It is the first action of this kind within the British Empire. It can be seen what the veterinary profession of the United States might face if it were nationalized.

All veterinary services in Tasmania are supplied by veterinary officials appointed by the Government for the various districts. Their services are available to the public at all times. The Government has established a schedule of fees which is in effect in all parts of Tasmania. The schedule includes:

1. For first visit to a case with or without minor operation.10/-*
   a. Subsequent visits to case. 5/-
2. Operations under a local anesthetic 10/-
3. Operations under a general anaesthetic .....£1 to £2*
4. Treatment by intravenous or subcutaneous injections in horses and adult cattle.10/
5. Post-mortem examinations on horses and adult cattle.10/
6. Foaling or calving cases...10/-to 15/-
7. Castration of colts.....£1
8. Castration of cattle.....10/-
9. Any medicines, drugs or dressing, etc., to be charged at cost price in addition to professional fees.
10. Examination of horses for soundness (excluding stallions) £1
11. General working hours of 9 a.m. to 5:30 p.m., Saturdays, Sundays and public holidays excluded.
12. Double fees are charged on Saturdays, Sundays and public holidays and outside general working hours. Operations and attendance not specified are charged for at such reasonable rates as may be decided by the Chief Veterinary Officer.

*Normal value of the shilling in U. S. currency is about 25 cents and of the pound sterling about $4.80.

In the event of any dispute, the matter is referred to the Chief Veterinary Officer.

B. T. WOODWARD

Santa Ana, California

Abstracts

The Recovery of By-Products from Poultry Evisceration Wastes

There is an increasing interest in the profitable disposal of the wastes from poultry packing plants.[11] It is due to increased appreciation of the possibilities for the profitable utilization of packing plant wastes, and to the growth of evisceration with a natural concentration of by-products at one point.

A Poultry Packing Plant, such as this Iowa plant, has huge amounts of evisceration wastes

The percentage of the live weight of chicken that reaches the consumer as ready-to-cook poultry varies from 65 to 75%. Among the by-products of poultry prepared for the table, only the feathers seem to have a ready market. Prices for these vary widely depending on pillow sales, imports of foreign feathers, and other factors. Raw heads, feet, viscera and blood have been used for hog feed but there are many objections to this practice.

With the increase in the evisceration of poultry, therefore, efforts are being made to find more suitable outlets for these wastes. The production of meat scrap product and soap stock oils seems to offer the most promising outlets for them.

Broilers and fryers yield appreciably lower amounts of oil than roasters, but heavy hen offals yield more oil than those of any other class of chickens. Difficulty will be experienced in dry rendering of broiler and fryer offals because of their very low fat content. Gizzard linings should not be used in making meat scrap and oil by the dry rendering process. Chicken scrap compares favorably with two other sources of supplementary protein when fed to chicks for eight weeks. The offals from poultry evisceration make a satisfactory meat scrap and a salable oil.

[11] Stewart, G. F., Iowa State College; F. E. Mussehl. 1941. The Recovery of By-Products from Poultry Evisceration Wastes. *Poultry Sci.*

Feeding Incubated Eggs to Growing and Fattening Pigs

For many years it has been known that raw egg white is poorly digested by omnivorous species such as dogs, rats and man.[14] When considerable amounts of raw egg albumin are eaten by these species, severe diarrhea develops. In the rat, the feeding of high levels of raw egg albumin not only leads to severe diarrhea, but skin lesions ultimately develop. Formerly these skin lesions in rats were ascribed to some toxic property of the uncooked egg white but in recent years this skin trouble has been found to be due to a deficiency in the vitamin, biotin, which was first isolated from egg yolk. It has been found that raw egg white creates this vitamin deficiency due to its peculiar property of seizing the supplies of this vitamin that may occur in the intestine and sweeping them from the body in the feces. Egg white itself contains biotin, but it never becomes available to the body if the egg white is eaten raw and not digested.

Limited experiments have been made at Cornell in feeding swine incubated raw chicken eggs obtained from a local hatch-

[14] Williams, J. P., C. M. McCay, O. N. Salmon and J. L. Krider. 1942. Feeding Incubating Eggs to Growing and Fattening Pigs; *Jnl. of Animal Sci.* 1:1, pp. 38-40.

ery. The pigs fed these eggs remained healthy in appearance and were always eager to eat the eggs and they grew normally to 200 pounds in weight. Furthermore a question arose concerning the possibility of improving the utilization of incubated eggs by swine if the eggs were cooked. These pigs continued to have good appetites and each gained at the rate of about 0.9 lb. daily. The results indicated that the fat and protein were as efficiently digested in the raw as in the cooked eggs.

There are two possible explanations for the results obtained. The first is that swine are unique in their ability to digest raw egg albumin and may possess an enzyme system for this purpose that is superior to that of the rat, dog or man. The second is that the holding of eggs at the temperature of the incubator may so modify the albumin that is subject to digestion and therefore no longer seizes or holds biotin so that it is unavailable to the body. This suggests, also, that biotin may be a key substance in the hatching of eggs.

The Relation of Riboflavin to Growth and Curled-Toe Paralysis in Chicks

Lepkovisky and Jukes[15] in 1936 showed that riboflavin is essential to chick nutrition. Similar observations have been noted by other workers and later investigators also reported that riboflavin is effective in preventing curled-toe paralysis, that large amounts of riboflavin completely prevented this paralysis whereas small additions to the basal ration permitted the condition to develop. The addition of small quantities of vitamin G supplement to the basal ration often increased the incidence of curled-toe paralysis whereas larger amounts decreased it. This led workers to suggest that this disease was due to a deficiency of some other factor rather than to a deficiency of the growth-promoting vitamin G. The problem was greatly clarified when it was demonstrated that a low riboflavin ration may cause two types of a nutritional deficiency. One of these produces a rapidly acute paralysis characterized as neuromalacia while the other is a more slowly developing form which causes curled-toe paralysis in the growing chick. The addition of adequate

riboflavin to the basal ration was found effective in preventing neuromalacia and in maintaining a normal histology in the peripheral nerve trunks.

In a series of studies carried out during the past several years to obtain further information on riboflavin in chick nutrition, it was found that synthetic and natural-occurring riboflavin were equally effective in preventing curled-toe paralysis and in promoting growth in chicks. The addition of riboflavin to the basal ration of dried pork liver fractions practically riboflavin-free, dried molasses, or a rice bran concentrate free of riboflavin prevented curled-toe paralysis and markedly increased growth. By means of controlled feed intake experiments, it was demonstrated that curled-toe paralysis is a manifestation of a riboflavin deficiency and not due to some other factor. No significant difference was found in the riboflavin requirement per unit of feed for maximum growth or the prevention of curled-toe paralysis between White Leghorn and crossbred (barred rock X New Hampshire) chicks. It was observed that chicks require greater amounts of riboflavin per unit of feed for the prevention of curled-toe paralysis than for promoting maximum growth. White Leghorn chicks, under the experimental conditions employed, required a minimum of approximately 250 micrograms for maximum growth to eight weeks and more than 300 micrograms of riboflavin per 100 grams of ration to prevent curled-toe paralysis. Riboflavin was found essential for efficient feed utilization, and the requirements in this respect approximated those for optimum growth.

[15] Bethke, R. M. and P. R. Record, 1941. The relation of riboflavin to growth and curled-toe paralysis in chicks. *Poultry Sci.*

Detecting Bloody Milk

Bloody milk[4] may be detected by allowing the first few streams to flow over a piece of black bakelite, on which it appears to have a pink color. If a half pint is held 12 hours the cream layer may show the presence of blood. Or the first few streams of suspected milk may be placed on filter paper, a few grains of powdered benzidine added, followed by a few drops of glacial acetic acid, and 4 to 6 drops of hydrogen peroxide. A positive test is indicated by a blue to green discoloration.

* * * *

Winter Wheat Grazing and Loss of Cattle

Throughout the southern high plains green wheat is the principal winter pasture.[5] As reported by Swanson (1935), in favorable years it may be grazed from two to five months without decreasing the grain yield. Farmers and ranchers rate it equal, or superior, to the native grasses as a pasture crop. Chemical analysis show it to be an excellent source of protein, calcium, phosphorus, magnesium and carotene.

Death losses occur from time to time in cattle grazing wheat. Bloat occurs following rains and snows and milk fever has been observed in relatively poor milk producers. It is possible that grass-tetany has also caused losses in range cattle grazing wheat pasture. This condition has become known locally as "wheat poisoning" and "protein poisoning." The latter name reflects the belief that the condition is the result of the high protein content of growing wheat.

From general observation it seems that the frequency of occurrence of these losses on wheat is related to the state of nutrition of the animal when put on wheat pasture. It is commonly thought that summer droughts resulting in poor summer pasture increase the susceptibility of animals to disorders while grazing wheat. High death rates have been noted in cattle shipped in from drought-stricken areas of New Mexico and Arizona.

Intravenous injection of calcium gluconate has proved an effective remedy for both milk fever and grass-tetany in cattle grazing wheat pasture. Stricken cattle in large pastures, however, often die before they are discovered. For this reason a means of preventing such losses is of vital interest.

Because of the uncertainty of the causes and prevention of disorders occurring in cattle on wheat pasture, some preliminary wheat grazing studies were begun during the 1940-41 grazing season. In this study chemical analysis showed growing wheat to be an excellent source of calcium, phosphorus, magnesium and protein. Before March 25 the calcium - phosphorus ratio averaged 1.1:1 and after March 25, 0.8:1.

When the calcium-phosphorus ratio of the wheat was above 1:1 Hereford calves grazing wheat pasture chose principally bone meal. As the calcium-phosphorus ratio became lower than 1:1 they ate ground limestone almost exclusively. Calves receiving bone meal and ground limestone failed to make more gain than those on wheat pasture alone. Calves receiving dry forage in addition to wheat pasture and mineral supplement made slightly larger gains than those receiving no dry feed.

Analyses of blood for serum calcium, phosphorus and magnesium failed to show any definite results that might be correlated with animal disorders resulting from grazing wheat. Blood phosphorus was lower for the calves on wheat pasture than for those in dry lot. Serum magnesium of animals receiving green wheat alone was lower than of those receiving mineral and dry feed.

Blood analyses from six animals stricken with symptoms resembling milk fever or grass-tetany while grazing wheat pasture, showed that serum calcium and phosphorus were low and serum magnesium high. As a result of treatment with calcium gluconate, serum calcium and phosphorus were increased while serum magnesium was generally lowered. Consideration of Ca:P, Mg:P, Ca:Mg and Ca plus Mg:P ratios in these cases failed to show any uniformity either before or after treatment. This supports the belief that grass-tetany and milk fever may be complex nervous or glandular disturbances instead of simple mineral deficiencies.

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[4] Brueckner, H. J., 1941. Detecting bloody milk. *Am. Milk Rev.* Abst. in *Jnl. Dairy Sci.* 25:9.

[5] McMillen, W. N. and W. Langham, 1942. Grazing winter wheat with special reference to the mineral blood picture. Abst from *Jnl. Animal Sci.* 1:1, pp. 14-21.

Fever Therapy in the Control of Cecal and Liver Trichomoniasis in Turkeys

Fevers induced by artificial[18] methods have been employed successfully during the past 15 years in the treatment of certain human diseases, particularly paresis, a form of paralysis caused by syphilis. Previously it was the consensus among most physicians that a rise in body temperature was a sign of disease, as is pain, and that to establish the comfort of a patient the excess heat must be dissipated. The evidence which has accumulated during recent years indicates that fever may be a valuable weapon of the body against an infection. In the case of man, various methods have been used to induce artificial fevers.

As far as the writers can determine, no previous experimental work has been conducted with the view of applying the principle of fever therapy to the treatment of diseases of birds. It seemed desirable to find whether any of the common poultry diseases, or parasites could be controlled by this treatment. It is known that protozoan diseases have been successfully treated in many cases by fever therapy, and in view of the fact that naturally infected birds, having trichomoniasis, a protozoan disease, were available among the station flock, this particular disease was selected for study.

This common disease of turkeys is caused by the protozoan parasite, *Trichomonas gallinarum,* which invades the tissues of the lower digestive tract and causes a chronic disease characterized by the production of lesions in the ceca and liver. These lesions closely resemble those produced by *Histomonas meleagridis* in the disease commonly known as blackhead. If the lesions produced by the two diseases are carefully examined and compared distinguishing characteristics can be seen.

In these investigations, which were made at the Beltsville Research Center, 60 crossbred turkeys ranging from 3 to 18 months of age were treated, of which 54 were naturally and six experimentally infected. Each bird was given three to six treatments of one to two hours at intervals of two days. The fever was induced by placing the birds within an airconditioned cabinet in which the air temperature was maintained at 104 to 106°F. and relative humidity at 50%. In this environment the body temperature of the turkey rose from the normal 106.5°F. up to 111 or 112°F.

Trichomoniasis, showing lesions typical of the disease in the crop and proventriculus

Fifty of the 60 infected birds that received the fever therapy recovered. Subsequent records of the treated birds showed that growth, fertility, and hatchability were not affected by the induced fever or previous disease. Sixty-two infected turkeys of the same age and quality as those which were treated served as controls. Fifty-four of these birds were naturally infected; eight were experimentally infected. Of these 62 control birds which received no treatment only 19 recovered from the trichomoniasis.

[18] Olsen, M. W., E. A. Allen. 1941. Fever Therapy in the Control of Cecal and Liver Trichomoniasis in Turkeys. *Poultry Sci.*

Book Reviews

Military Medical Manual by various authors, 5th edition; 1007 pages, profusely illustrated with maps, plates, halftones, and drawings. Military Service Publishing Company, Harrisburg, Pa., 1942. Price—$5.00.

The objective of this work is to present information of practical value to officers of the Medical Department (medical, dental, veterinary, medical administrative and sanitary corps) of the Army. The sources of the subject matter are official publications of the War Department and instructional material published by the general and special service schools of the army. Of it the Surgeon General states in a foreword, "Earlier editions of this book have been a great help . . . The present issue has been modified, where necessary, to meet the requirements of current practice and may be accepted as a practical and reliable text concerning military medical matters."

You may obtain any book reviewed in this department by remitting the published price to the Book Department of VETERINARY MEDICINE, 7632 S. Crandon Ave., Chicago, Ill.

The work is divided into three sections. The first describes the organization of the army, the tactical functions of the arms, i.e., the job of each component in the war team, employment of combined arms, command and staff procedure, map reading, aerial photograph interpretation, military courtesy and dicipline, and customs of the military service. All is essential information to any officer of any arm or service.

Part II deals exclusively with medico-military subjects. It is weighted on the side of the medical officer and in comparison deals but lightly in information for the veterinary officer. The information is all informative and generally useful to the veterinary officer but only a minor part is essential.

Part III deals with medical tactics and administration — information essential to all officers of the Medical Department of the Army. Although the majority of veterinary organizations are mentioned briefly, there is no discussion of their duties—a serious omission.

The work is a required text at the Medical Field Service School, Carlisle Barracks, Pennsylvania, to which several hundred officers are sent every month.

It is practically a *must* reading for every medical department officer. The officer familiar with its contents will soonest find his niche in the military team and function with the least friction. The price of the book is modest for a work of this size and quality. The extent of the discussion—a thousand pages—suggest that officers begin the study of it before being ordered to active duty.

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Diseases of the Horse. *By Leonard Pearson, Rush Shippen Huidekoper, Ch. B. Michener, W. H. Harbaugh, James Law, W. R. Trumbower, A. F. Liautard, A. A. Holcombe and John W. Adams.* The first edition of this volume appeared in 1890. The 1942 revision is by Herbert Bunyea, John R. Mohler, G. T. Creech, Maurice S. Shahan, W. S. Gochenour and L. T. Giltner. 548 pages, 14 illustrations in the text and 42 full-page plates, 12 in color. For sale by the Superintendent of Documents, Washington, D. C. Price—$1.75, or free from your Congressman.

Diseases of Cattle. *By Leonard Pearson, A. J. Murray, V. T. Atkinson, W. H. Harbaugh, W. H. Lowe, James Law, John R. Mohler, M. R. Trumbower and B. H. Ransom.* The first edition was published in 1892. The 1942 revision is by L. T. Giltner, C. D. Stein, W. T. Huffman, W. E. Cotton, W. T. Miller, Chester Dale, John R. Mohler, W. M. Mohler, Maurice S. Shahan and G. T. Creech. 507 pages, 24 illustrations in the text and 50 full-page plates, 18 in color. For sale by the Superintendent of Documents, Washington, D. C. Price—$1.75, or free from your Congressman.

These special reports of the U. S. Department of Agriculture, first issued a half century ago and having undergone many revisions are so well known no description of them is necessary for veterinarians.

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Booklets

Raising Rabbits (18 pages), and **Marketing Your Rabbits** (52 pages). Discussions on selecting breeds, management, care, hutch building, feeding and marketing rabbits. In addition a brief summary of rabbit diseases and their causes are given. However, rabbit producers are advised to call the local veterinarian in case of disease or disease losses. Free. Purina Mills (Ralston Purina Company), St. Louis, Mo.